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JUNE 18, 1928

Issued Weekly

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VOLUME  
XXIV

## *Special Features*

The Wallace Touroplane  
Engine Exhaust Silencers  
Aircraft Radio Beacon Development

NUMBER  
25

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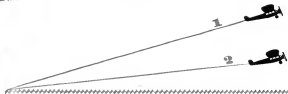
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The Oldest American Aeronautical Magazine

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JUNE 18, 1938

No. 26

## An Injustice

WHEN AMERICA released the war there was a rush to get to officers' training camps. Those who volunteered for the Air Service got started just as soon as others but places were not ready and the training was longer than for the other branches of the service. As a result the flying cadets did not get their commissions until after those who had entered at the same time.

As pay officers are promoted in the order of their receiving their commissions, and as about half of our present force of officers joined at the time of the war, it follows that the Air Corps officers are at the bottom of the list and that they will be promoted while others who joined other branches of the Army after they did have a much higher rank. This is unfair, not only from the point of view of pay, for the Air Corps officers get extra compensation for flying, but from the standpoint of moral efficiency. It is a great handicap to the Air Corps to have its officers of lower grade than its officers of other branches of the service who have had an equal amount of experience.

For many years those who knew the situation have been trying to have it remedied by Congressional action, but it was not until this year that everything seemed to have the separate provision bill go through. This bill introduced by Congressman Furber had been passed a number of times by the House, but as its hurry to get into the Senate turned it down without any consideration whatsoever. There is no possibility of the bill going through this year but it is of such vital importance to the healthy development of the Air Corps that every influence should be brought to bear to see that it is not sidetracked again next year.

## Financing the Purchaser

ONE OF the greatest needs of the aircraft industry today is some sort of financing company which would help dealers and aircraft operators to purchase planes before they were able to fully pay for them. Financing companies of this sort are very common in the automobile field and their operations have been so successful that the majority of automobiles purchased in this country are bought on the installment plan.

The fact that airplane financing companies have not been successful in the past does not mean that they could not be made to work at the present time though it must be admitted that several serious difficulties present themselves. The chief one of these is the accident risk which is taken upon has proved to be a moral risk as much as an actual risk. The majority of those who buy a sought financing have been new to the game

or else more or less unscrupulous. As a result they were not so fast at the end of the season that they were not going to be able to pay off the notes on per sechedule. Under such circumstances it was a great temptation to be careless in the handling of the plane and there were many accidents on which insurance was collected and it was necessary to bond insurance notes on airplanes, which had not been paid for, up to a prohibitive figure.

Conditions now have changed very considerably. There are a large number of reputable and experienced fixed base operators who could handle a much larger number of planes if they had the working capital. Many of these operators have been in business for a long time and have a good operating record. By using a little discretion there is little doubt that certain operators would make perfectly good risks and that an airplane finance corporation could be established to the benefit of the financiers and to the advancement of the airplane sales.

## Schools of Thought

CONTROL BEYOND the stalling speed is engaging and an enormous amount of attention at the present time and there is little doubt but that if planes were built so that they would not stall or spin that the safety of aircraft would be greatly increased. At present there are two very different schools of thought in the subject. One claims that by using proper wing shape and by properly distributing the weight it is possible to build a plane which will not get out of control even if it is forced to settle rapidly while on an even keel. The other school believes that it is necessary to provide some auxiliary device which will function when the wing has actually reached the stalling point.

The wonderful deaeronautics given recently with the Hantz-Pape monomoteur plane has focused much attention on this device and strengthened the point of view of the latter school. The development of wings which stall wing curves has not however been at a standstill. The N.A.S.A. has developed a wing section where the lift instead of rising steadily and then dropping off very suddenly with increasing angle of incidence rises up to a certain point and then continues lifting at about the same rate so that in a plane with the proper weight distribution a stall or spin would be practically impossible.

It is interesting to have competent engineers so evenly divided on principles which are fundamentally so different but as both schools of thought are working to achieve a very valuable end the losses will not worry provided that either one or both or a combination achieve the result desired.

# Engine Exhaust Silencers

Brief Descriptions of the Various Designs that Have Been Developed to Eliminate the Noise of the Exhaust

By RICHARD M. MOCK

ELIMINATION OF noise in airplanes seems to be a prevalent tendency in design. The consequences of the noise of the power plant are apparent and it is natural that much attention should be directed to the principal source of noise—the exhaust. Of course, the sounds given off by the propeller, as well as that of the engine itself, are considerable factors, but it would be useless to attempt to eliminate them until the exhaust of the engine has been quieted. Considerable effort, both in this country and abroad, has been devoted to the silencing of engine exhaust noise. Already, engineers are now common who in the United States wear long exhaust pipes or exhaust manifolds with "silencers" and are suffering from it.

The loss of engine power, and also the tendency to back valves when operating in hot climates, through increased back pressure in the exhaust manifold has been one of the "bugbears" of the engineers. However, it has been demonstrated that, with proper design, power loss may be decreased to a minimum, as, in some cases, the engine power increased. In addition, as exhaust silencers, of good design, has the advantage of eliminating the flames of the burning gases from the view of the pilot for night flight. Operations have been made

recently, sound reduction is of considerable importance in radio communication with airplanes as well as the reduction of long flights.

The standard aircraft engine, as most production planes, has an exhaust manifold which shows little effort to silence the exhaust. The most common type of manifold, a tube engine, is a ring for collecting the exhaust gas, and a long tube to carry the exhaust gas to the bottom. The exhaust pipe is long usually has a common exhaust manifold mounted on each bank of cylinders, with an open



Illustration of the type of muffler being produced by both the Air Corps, San Antonio, Tex.

end, one end. On some designs there are short tubes on each cylinder or a group of cylinders. Each type of engine produces a different type of noise, and from these observations it does not appear that any consideration of the elimination of noise has entered into most manifold designs. Most American engine manufacturers do not supply exhaust manifolds but leave this responsibility to the airplane manufacturer.

Noises can be eliminated from an engine exhaust by their reduction of the velocity of the burned gases. This may be accomplished by three methods: regular expansion, change of direction, or surface friction. Most exhaust silencers employ a combination of two or three of these. The simplest type of silencer is the long exhaust pipe, common on most biplane planes. The exhaust manifold is connected to a flexible tube suspended lengthwise below the fuselage, leading back to a point under the cabin. The gases expand gradually as they approach the end of the tube and their velocity is decreased by the friction of the walls of the tube. The method causes only a slight back pressure and the noise may be directed away from the cabin. The most type of silent burner reduces the noise slightly by this method as it requires a somewhat longer exhaust pipe than is usually required.

The method of changing the direction of the exhaust gases reduces their velocity, which by the use of heat as an exhaustable muffler, makes the gas a reduction in velocity as it enters it on an exhaust surface. In addition, the turbulence is usually quite heavy. Another method is to change the direction of the gases and their shock, which is that of the exhaust manifold with the so-called "bouncing" noise. The end of the exhaust pipe is completely sealed as poorly closed, while the end is provided with small holes having an aggregate opening more than

the rest of the gases. The silencing end of the pipe is usually obtained by reflecting out the sound of the gas near the end, thus silencing the free end of it. It is understood that this type was first used on the war. In case of exhaust of being able to meet with the long exhaust pipe, which tends to cause still further. It comes practically no addition in weight, and only a slight decrease in power. The exhaust end is completely sealed except a power loss of approximately one per cent, while with the end greatly expanded, the loss is negligible. However, as a noise release this type of exhaust pipe, in fact as effective as some others.

## Standard on Fairchild Planes

The type of silencer is now standard equipment on Fairchild planes. The exhaust of the engine is carried through a ring manifold with two openings at the bottom on each side. One opening is connected to an exhaust pipe fitted with an exhaust burner connected to the cockpit. The other is fitted with a form of silencing end. The pipe extends to the silencing end, and the end is tapered in a wedge shape and is reduced near the end so that it resembles a wedge. The sides of the wedge are perforated with small holes for the exit of the exhaust gases. According to figures supplied by the Fairchild Company, this type of silencer reduces power loss, there is a back pressure equal to a column of water one half inch high. The added weight is only three quarters of a pound and the end when the exhaust noise sufficiently to prevent the reduced end of production and the additional weight.

A modification of this type is the "sawtooth" or "saw" type of exhaust pipe opening, developed by the Curtiss Aircraft & Motor Co. This consists of a tapered end to the exhaust pipe. It decreases in cross section towards the end and



Wing combination and exhaust type muffler developed by the Dayton Wright Airplane Co. installed for test purposes on an Army plane.

A low, tapered opening carrying the length of the tapered end, there are no perforations in the wall, the longitudinal opening being sufficient for the exit of gases. This type of exhaust is used on engines, with one of the silencers on each engine. Improvements have been made on some engines by fitting on a long "bypass" exhaust opening on a common manifold for all groups of cylinders. The end weight is less than a short exhaust stack and offers less air resistance. The power is hardly affected and the noise is somewhat

reduced. The type of exhaust stack, that is a really what it is, can be produced fairly cheaply as it consists only of a sheet metal rolled up into a cone with the seam left open, spaced by wooden plates between the joints of metal. It is understood that it is produced by joints held by the Curtiss company. The type with individual stack for each cylinder, as produced by the Curtiss company, averages 1.5 lb. for the



Fairchild-Dunbar exhaust silencer on a 200 hp. powered with a 200 hp. engine. There are two silencers, one on each side, 200 in. long and weighs 1.5 lb.

Wright Whirlwind and 1.5 lb. each for the Pratt & Whitney Wasp. As the Whirlwind exhaust pipe is on the side of the cylinder there is a bend in the stack, making it slightly curved.

A somewhat similar muffler is that now installed on Bell planes. It consists of a long exhaust pipe carried below the fuselage on the left side of the engine. The pipe begins to curve and has two small openings on one side to provide for the exit of the gases. It is a combination of a burner and a cold burner as well as exhaust silencer. It is used to be exceptionally quiet, especially as it carries the noise away from the occupants of the plane. The weight is approximately the same as the usual long exhaust pipe, but the installation is more efficient, though more costly. It costs only \$25.00 as of memory back pressure in the manifold and does not appear to affect the performance of the plane as the engine has the same speed with and without the manifold.

## Test Made on a Liberty Engine

Another type of muffler that decreases the velocity of the rapidly expanding gases, by changing their direction, is the "whirl" type. The gases enter a normal exhaust pipe in a straight line, usually at a tangent to the pipe, which causes the gases to rotate or whirl in the exhaust pipe, slowly reducing their velocity. These mufflers were tested on a Liberty engine (one for each cylinder bank) by the Material Division of the Army Air Corps and were found to cause no appreciable decrease in power, being approximately 30 per cent of full throttle. It is stated that the noise was so reduced that on a DH the whistling of the wires, rattle of the valves, and noise of the propeller predominated in the sounds which could be heard.

It was stated above that a muffler, if properly designed, would increase the power of an engine. This may be done by silencing the exhaust to create a negative pressure in the engine exhaust manifold and thus reduce the back pressure,

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Showing the typical end pipe of exhaust on the exhaust of a "Whirlwind" engine by Fairchild-Dunbar.

because of the pressure of the air and the noise of the engine, but with present day information in airplane design these objections have been reduced to the point where they are overshadowed by the advantages in the reduction in noise. Apart from the reduction of the engine power, pilots and crew living in the vicinity of an airport (which is really per-



# Fuselage Analysis

## Stress Analysis of Commercial Aircraft, Chapter Number Fourteen

By PROFESSOR ALEXANDER KLEMIN

Principal, Department of Aeronautics

And GEORGE F. TITERTON

Chief of the Bureau of Aeronautics Army Department

IN THIS three-point landing analysis the plane is assumed resting on the wheels and tail skid. The panel weights are acting vertically downward perpendicular to the ground line. They are balanced by reactions at the wheels and tail skid. The components of these reactions and the loads transmitted by the chains strain to the fuselage may be obtained from the chain analysis of Chapter 13. These are all the forces acting in this condition and when they are in equilibrium the graphical solution may be made.

The design panel loads for this condition may be obtained as in the following table. These design panel loads are identical with the vertical components of the panel loads in the level landing condition. They need not be repeated here as we have done in the following table. It has been done below merely to show that they actually are equal. These panel loads are applied perpendicular to the ground line as shown in Fig. 93.

### Design Panel Loads—Three-Point Landing

Panel Point	(1) Panel Weights		(2) Panel Loads due to Chains		(3) Panel Loads due to Chains		(4) Panel Loads due to Chains	
	lb.	sq. ft.	lb.	sq. ft.	lb.	sq. ft.	lb.	sq. ft.
1	35	1.0	35	1.0	35	1.0	35	1.0
2	35	1.0	35	1.0	35	1.0	35	1.0
3	35	1.0	35	1.0	35	1.0	35	1.0
4	35	1.0	35	1.0	35	1.0	35	1.0
5	35	1.0	35	1.0	35	1.0	35	1.0
6	35	1.0	35	1.0	35	1.0	35	1.0
7	35	1.0	35	1.0	35	1.0	35	1.0
8	35	1.0	35	1.0	35	1.0	35	1.0
9	35	1.0	35	1.0	35	1.0	35	1.0
10	35	1.0	35	1.0	35	1.0	35	1.0
11	35	1.0	35	1.0	35	1.0	35	1.0
12	35	1.0	35	1.0	35	1.0	35	1.0
13	35	1.0	35	1.0	35	1.0	35	1.0
14	35	1.0	35	1.0	35	1.0	35	1.0
15	35	1.0	35	1.0	35	1.0	35	1.0
16	35	1.0	35	1.0	35	1.0	35	1.0
17	35	1.0	35	1.0	35	1.0	35	1.0
18	35	1.0	35	1.0	35	1.0	35	1.0
19	35	1.0	35	1.0	35	1.0	35	1.0
20	35	1.0	35	1.0	35	1.0	35	1.0
21	35	1.0	35	1.0	35	1.0	35	1.0
22	35	1.0	35	1.0	35	1.0	35	1.0
23	35	1.0	35	1.0	35	1.0	35	1.0
24	35	1.0	35	1.0	35	1.0	35	1.0
25	35	1.0	35	1.0	35	1.0	35	1.0
26	35	1.0	35	1.0	35	1.0	35	1.0
27	35	1.0	35	1.0	35	1.0	35	1.0
28	35	1.0	35	1.0	35	1.0	35	1.0
29	35	1.0	35	1.0	35	1.0	35	1.0
30	35	1.0	35	1.0	35	1.0	35	1.0
31	35	1.0	35	1.0	35	1.0	35	1.0
32	35	1.0	35	1.0	35	1.0	35	1.0
33	35	1.0	35	1.0	35	1.0	35	1.0
34	35	1.0	35	1.0	35	1.0	35	1.0
35	35	1.0	35	1.0	35	1.0	35	1.0
36	35	1.0	35	1.0	35	1.0	35	1.0
37	35	1.0	35	1.0	35	1.0	35	1.0
38	35	1.0	35	1.0	35	1.0	35	1.0
39	35	1.0	35	1.0	35	1.0	35	1.0
40	35	1.0	35	1.0	35	1.0	35	1.0
41	35	1.0	35	1.0	35	1.0	35	1.0
42	35	1.0	35	1.0	35	1.0	35	1.0
43	35	1.0	35	1.0	35	1.0	35	1.0
44	35	1.0	35	1.0	35	1.0	35	1.0
45	35	1.0	35	1.0	35	1.0	35	1.0
46	35	1.0	35	1.0	35	1.0	35	1.0
47	35	1.0	35	1.0	35	1.0	35	1.0
48	35	1.0	35	1.0	35	1.0	35	1.0
49	35	1.0	35	1.0	35	1.0	35	1.0
50	35	1.0	35	1.0	35	1.0	35	1.0
51	35	1.0	35	1.0	35	1.0	35	1.0
52	35	1.0	35	1.0	35	1.0	35	1.0
53	35	1.0	35	1.0	35	1.0	35	1.0
54	35	1.0	35	1.0	35	1.0	35	1.0
55	35	1.0	35	1.0	35	1.0	35	1.0
56	35	1.0	35	1.0	35	1.0	35	1.0
57	35	1.0	35	1.0	35	1.0	35	1.0
58	35	1.0	35	1.0	35	1.0	35	1.0
59	35	1.0	35	1.0	35	1.0	35	1.0
60	35	1.0	35	1.0	35	1.0	35	1.0
61	35	1.0	35	1.0	35	1.0	35	1.0
62	35	1.0	35	1.0	35	1.0	35	1.0
63	35	1.0	35	1.0	35	1.0	35	1.0
64	35	1.0	35	1.0	35	1.0	35	1.0
65	35	1.0	35	1.0	35	1.0	35	1.0
66	35	1.0	35	1.0	35	1.0	35	1.0
67	35	1.0	35	1.0	35	1.0	35	1.0
68	35	1.0	35	1.0	35	1.0	35	1.0
69	35	1.0	35	1.0	35	1.0	35	1.0
70	35	1.0	35	1.0	35	1.0	35	1.0
71	35	1.0	35	1.0	35	1.0	35	1.0
72	35	1.0	35	1.0	35	1.0	35	1.0
73	35	1.0	35	1.0	35	1.0	35	1.0
74	35	1.0	35	1.0	35	1.0	35	1.0
75	35	1.0	35	1.0	35	1.0	35	1.0
76	35	1.0	35	1.0	35	1.0	35	1.0
77	35	1.0	35	1.0	35	1.0	35	1.0
78	35	1.0	35	1.0	35	1.0	35	1.0
79	35	1.0	35	1.0	35	1.0	35	1.0
80	35	1.0	35	1.0	35	1.0	35	1.0
81	35	1.0	35	1.0	35	1.0	35	1.0
82	35	1.0	35	1.0	35	1.0	35	1.0
83	35	1.0	35	1.0	35	1.0	35	1.0
84	35	1.0	35	1.0	35	1.0	35	1.0
85	35	1.0	35	1.0	35	1.0	35	1.0
86	35	1.0	35	1.0	35	1.0	35	1.0
87	35	1.0	35	1.0	35	1.0	35	1.0
88	35	1.0	35	1.0	35	1.0	35	1.0
89	35	1.0	35	1.0	35	1.0	35	1.0
90	35	1.0	35	1.0	35	1.0	35	1.0
91	35	1.0	35	1.0	35	1.0	35	1.0
92	35	1.0	35	1.0	35	1.0	35	1.0
93	35	1.0	35	1.0	35	1.0	35	1.0
94	35	1.0	35	1.0	35	1.0	35	1.0
95	35	1.0	35	1.0	35	1.0	35	1.0
96	35	1.0	35	1.0	35	1.0	35	1.0
97	35	1.0	35	1.0	35	1.0	35	1.0
98	35	1.0	35	1.0	35	1.0	35	1.0
99	35	1.0	35	1.0	35	1.0	35	1.0
100	35	1.0	35	1.0	35	1.0	35	1.0

As in the previous condition panel points a and b will be calculated into one point 0.32 on each of the prop frame. The load on this point will be 211 plus 1179 equals 1390 lb.

Referring back to the three-point landing analysis in Chapter 10 we will now determine the loads in the chain struts and at the tail skid. This has been done in the following table. As in the case of level landing we must divide by 1.45

to obtain the loads on the fuselage. It will be recalled that 1.45 is the correction factor which we applied when we moved our forces from the center of the wheel back to the strut point.

### Chain Reactions—Three-Point Landing

	Area	Yield	Yield	Yield	Yield	Yield
Point	in 1 ft	Comp.	Comp.	Comp.	Comp.	Comp.
Point 1	445	475	—455	—274	593	210
Point 2	—1000	300	—1000	—1000	—1000	—1000
Point 3	—1000	300	—1000	—1000	—1000	—1000
Point 4	—1000	300	—1000	—1000	—1000	—1000
Point 5	—1000	300	—1000	—1000	—1000	—1000
Point 6	—1000	300	—1000	—1000	—1000	—1000
Point 7	—1000	300	—1000	—1000	—1000	—1000
Point 8	—1000	300	—1000	—1000	—1000	—1000
Point 9	—1000	300	—1000	—1000	—1000	—1000
Point 10	—1000	300	—1000	—1000	—1000	—1000
Point 11	—1000	300	—1000	—1000	—1000	—1000
Point 12	—1000	300	—1000	—1000	—1000	—1000
Point 13	—1000	300	—1000	—1000	—1000	—1000
Point 14	—1000	300	—1000	—1000	—1000	—1000
Point 15	—1000	300	—1000	—1000	—1000	—1000
Point 16	—1000	300	—1000	—1000	—1000	—1000
Point 17	—1000	300	—1000	—1000	—1000	—1000
Point 18	—1000	300	—1000	—1000	—1000	—1000
Point 19	—1000	300	—1000	—1000	—1000	—1000
Point 20	—1000	300	—1000	—1000	—1000	—1000
Point 21	—1000	300	—1000	—1000	—1000	—1000
Point 22	—1000	300	—1000	—1000	—1000	—1000
Point 23	—1000	300	—1000	—1000	—1000	—1000
Point 24	—1000	300	—1000	—1000	—1000	—1000
Point 25	—1000	300	—1000	—1000	—1000	—1000
Point 26	—1000	300	—1000	—1000	—1000	—1000
Point 27	—1000	300	—1000	—1000	—1000	—1000
Point 28	—1000	300	—1000	—1000	—1000	—1000
Point 29	—1000	300	—1000	—1000	—1000	—1000
Point 30	—1000	300	—1000	—1000	—1000	—1000
Point 31	—1000	300	—1000	—1000	—1000	—1000
Point 32	—1000	300	—1000	—1000	—1000	—1000
Point 33	—1000	300	—1000	—1000	—1000	—1000
Point 34	—1000	300	—1000	—1000	—1000	—1000
Point 35	—1000	300	—1000	—1000	—1000	—1000
Point 36	—1000	300	—1000	—1000	—1000	—1000
Point 37	—1000	300	—1000	—1000	—1000	—1000
Point 38	—1000	300	—1000	—1000	—1000	—1000
Point 39	—1000	300	—1000	—1000	—1000	—1000
Point 40	—1000	300	—1000	—1000	—1000	—1000
Point 41	—1000	300	—1000	—1000	—1000	—1000
Point 42	—1000	300	—1000	—1000	—1000	—1000
Point 43	—1000	300	—1000	—1000	—1000	—1000
Point 44	—1000	300	—1000	—1000	—1000	—1000
Point 45	—1000	300	—1000	—1000	—1000	—1000
Point 46	—1000	300	—1000	—1000	—1000	—1000
Point 47	—1000	300	—1000	—1000	—1000	—1000
Point 48	—1000	300	—1000	—1000	—1000	—1000
Point 49	—1000	300	—1000	—1000	—1000	—1000
Point 50	—1000	300	—1000	—1000	—1000	—1000
Point 51	—1000	300	—1000	—1000	—1000	—1000
Point 52	—1000	300	—1000	—1000	—1000	—1000
Point 53	—1000	300	—1000	—1000	—1000	—1000
Point 54	—1000	300	—1000	—1000	—1000	—1000
Point 55	—1000	300	—1000	—1000	—1000	—1000
Point 56	—1000	300	—1000	—1000	—1000	—1000
Point 57	—1000	300	—1000	—1000	—1000	—1000
Point 58	—1000	300	—1000	—1000	—1000	—1000
Point 59	—1000	300	—1000	—1000	—1000	—1000
Point 60	—1000	300	—1000	—1000	—1000	—1000
Point 61	—1000	300	—1000	—1000	—1000	—1000
Point 62	—1000	300	—1000	—1000	—1000	—1000
Point 63	—1000	300	—1000	—1000	—1000	—1000
Point 64	—1000	300	—1000	—1000	—1000	—1000
Point 65	—1000	300	—1000	—1000	—1000	—1000
Point 66	—1000	300	—1000	—1000	—1000	—1000
Point 67	—1000	300	—1000	—1000	—1000	—1000
Point 68	—1000	300	—1000	—1000	—1000	—1000
Point 69	—1000	300	—1000	—1000	—1000	—1000
Point 70	—1000	300	—1000	—1000	—1000	—1000
Point 71	—1000	300	—1000	—1000	—1000	—1000
Point 72	—1000	300	—1000	—1000	—1000	—1000
Point 73	—1000	300	—1000	—1000	—1000	—1000
Point 74	—1000	300	—1000	—1000	—1000	—1000
Point 75	—1000	300	—1000	—1000	—1000	—1000
Point 76	—1000	300	—1000	—1000	—1000	—1000
Point 77	—1000	300	—1000	—1000	—1000	—1000
Point 78	—1000	300	—1000	—1000	—1000	—1000
Point 79	—1000	300	—1000	—1000	—1000	—1000
Point 80	—1000	300	—1000	—1000	—1000	—1000
Point 81	—1000	300	—1000	—1000	—1000	—1000
Point 82	—1000	300	—1000	—1000	—1000	—1000
Point 83	—1000	300	—1000	—1000	—1000	—1000
Point 84	—1000	300	—1000	—1000	—1000	—1000
Point 85	—1000	300	—1000	—1000	—1000	—1000
Point 86	—1000	300	—1000	—1000	—1000	—1000
Point 87	—1000	300	—1000	—1000	—1000	—1000
Point 88	—1000	300	—1000	—1000	—1000	—1000
Point 89	—1000	300	—1000	—1000	—1000	—1000
Point 90	—1000	300	—1000	—1000	—1000	—1000
Point 91	—1000	300	—1000	—1000	—1000	—1000
Point 92	—1000	300	—1000	—1000	—1000	—1000
Point 93	—1000	300	—1000	—1000	—1000	—1000
Point 94	—1000	300	—1000	—1000	—1000	—1000
Point 95	—1000	300	—1000	—1000	—1000	—1000
Point 96	—1000	300	—1000	—1000	—1000	—1000
Point 97	—1000	300	—1000	—1000	—1000	—1000
Point 98	—1000	300	—1000	—1000	—1000	—1000
Point 99	—1000	300	—1000	—1000	—1000	—1000
Point 100	—1000	300	—1000	—1000	—1000	—1000

# The Wallace Touroplane

Two and Three Place Models of Folding Wing, Cabin Monoplane Differ Only in Seating Arrangement and Engine Installation

MANY FAVORABLE comments have been made on the Wallace Touroplane, now being put into production by the Wallace Aircraft Co., Chicago, Ill. It is a light, two or three place, folding wing monoplane with the conventional seating in a closed cabin under the wing. The two-place model is powered with an 80 hp. Anzani engine and differs from the three place model only in engine installation and seating arrangement. The three place design is powered with a 120 hp. Anzani engine with the mount such that a 125 hp. Ryan-Bossman, 120 hp. Fairchild-Camper, or 120 hp. Wright Whirlwind can be substituted. The two place plane weighs 3500 lb. empty and has, it is stated, a high speed of 97.1 m.p.h. over a measured course. The landing speed is 45.2 m.p.h. and climb 474 f.p.m. The three place model with an Anzani engine weighs 3600 lb. landed and has a top speed of 130 m.p.h. with a landing speed of 48 m.p.h.

Wing Area is 205 Sq. Ft.

Perhaps one of the most interesting features of the Touroplane is the wing. It employs an S.W.4c airfoil tested in the Eiffel wind tunnel. According to figures supplied by Stanley Wallace, designer of the plane, it has a maximum absolute lift coefficient of 3.95 ( $C_{Lmax}$  = 0.00395) and a maximum absolute resistance coefficient of 0.125 ( $C_{Dmax}$  = 0.000125). The maximum L/D is 15.6. The airfoil is of moderately thick section with a divided leading edge and slightly depressed trailing edge. Including the ailerons, the wing area is 205 sq. ft. The span is 37 ft. and chord 5 ft. 10 in. Structurally the wing is of conventional design, constructed in that it may be easily folded. The center section extends to provide each side of the fuselage and its trailing edge hinges about the rear spar to provide a recess for the trailing edge of the outer panel of the main wing. The outer panels are attached by vertical pins at the outer panels and at the fittings for the wing main struts. The pins in the forward spar and at the lower end of the forward strut can be removed and the wings folded about the rear spar and rear wing

brake strut points. To support the front spar, when the wings are folded, the forward bracing strut is attached to its rear end, to a fitting on the rear strut.

The wings are constructed of wood, strong solid section Ponce spruce spars and built-up, Warren truss ribs. The spars are not treated and are the same size, front and rear. The ribs are made of 5/16 in. square spruce capstrips with 1/32 in. mahogany gusset plates glued and nailed to the ribs at the joints. These ribs were tested at New York City



Rear quarter view of the Wallace Touroplane

variously and found to have a wide margin of safety over the required load. The drag from wings are 29.30 ounces when they are disabled, one set of wires lying in the plane of the top of the spars and the other set at the bottom. Compression struts except at the point where the wing panels are hinged to the center section, are formed by gluing and nail spruce strips to either side of a former rib, in the plane of the top and bottom drag trusses. The compression strut at the center section is an S made up of three pieces of 1/2 in. by 600 in. steel tubing. It is made integral with the fittings which attach to the front and rear spars at the wing panels. The wings are covered with Flugzeug fabric and tape and reinforcing type is placed over the ribs.

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Front quarter view of the Wallace Touroplane powered with an 80 hp. Anzani engine.

# Aero Club of New Brunswick

Some General Information Regarding Its Formation and Activities Together With Its Constitution and By-Laws

By JOSEPH FUCHS

Secretary, Aero Club of New Brunswick

A GROUP of interested persons organized the Aero Club of New Brunswick, N. J., Sept. 17, 1936. One of the first acts to be done was to incorporate. We divided our members into two classifications. The associate members are the non-flying members and the active members are the flying members. In order to become an associate member all that was necessary was to pay one year's dues in advance. To become an active member required an admission fee of \$10 which was to be placed in a separate fund for the purpose of purchasing a plane. At the present time we have 22 active members and approximately 35 associate members. With the money obtained from the active members the Aero Club of New Brunswick, N. J., purchased a Pilbeam, O. 1, a plane which the Club now has. This organization was organized to give the flying members the same treatment as the non-flying members—the associate members and the active members.

## Only Active Members May Fly

Active members only may fly the Club's plane. It costs \$15 per hour for any active member to use the Club's plane. Associate members may fly as observer members. Presently no number of the organization is allowed to fly in the Club's plane.

In order to insure all associate members in aviation, on the 60-day per year which an associate member pays, all dues for the year, also pays for a subscription to *Aeronautics*. During as we do it is our duty to tell associates to fly in the Club's plane who may pay the Aero Club for purposes of aerial support. Some many of our members have been receiving aviation they have become more interested in the advancement of aeronautics and a good number of them who have never taken a lesson before now are flying.

At the present time the Aero Club of New Brunswick, N. J., is sponsoring a Junior Air Derby for boys of the ages ranging from five to 16. The purpose of this Junior Air Derby is to let boys to build their own models, have them flying models or aerobically to build, and in this way interest both the children and the parents in aviation. When the application for such entries closed there were over 40 entries and the most prominent to be highly successful. We have business meetings and several training sessions as our judges. At every meeting we have experts of some plane of aviation to discuss the Club members. Some of the speakers whom we have had are: Lieutenant Commander M.D. Bennett of the U. S. Navy; George Andrews, U. S. Department of Agriculture, member expert; Mr. Pease, of the Pioneer Insurance Co., and Otto Leach of the Daniel Guggenheim School of Aeronautics.

The Aero Club of New Brunswick is a success financially and is successful in carrying out its idea of selling the idea of flying to the people in and about New Brunswick, N. J. The Aero Club of New Brunswick, N. J., does not teach its active members how to fly. We feel that such instruction should be obtained from some legitimate school established for that purpose, and then after such instruction are de-

tailed, and the student knows how to fly, he may join as an active member and may secure the use of the Club plane to continue his flying. We found out that it is far more desirable that such instruction be obtained at a competent school. The following are the By-Laws of the club:

- (1) Strict observance of all Air Commerce Regulations.
- (2) All pilots to keep log.
- (3) No passengers to be carried under 10 ft. solo.
- (4) No flying after sunset.
- (5) No cross-country flights until pilot has had 10 ft. solo and has received instruction in same.
- (6) Only one control stick to be in plane unless transport pilot is present.
- (7) All members should realize that physical fitness is essential to the successful piloting of aircraft and should act accordingly.
- (8) No aerobics unless transport pilot is in plane.
- (9) Caution to be taken of flying weather conditions.
- (10) Cross country flights to be discontinued if bad weather threatens.
- (11) If mechanical trouble develops test flight should be made by transport pilot.
- (12) Flights to be paid for before leaving field.
- (13) Plane to be secured by pilot at completion of each flight; except when plane is to be used again in consecutive flights.
- (14) Every pilot who has lost their within 15 days must be checked out by instructor.
- (15) All pilots before flight must make entry in Club log, also on return from flight, sign in and sign out.
- (16) Pilots will be held responsible for damage if any of the above rules are violated.

## CONSTITUTION AND BY-LAWS OF THE AERO CLUB OF NEW BRUNSWICK, NEW JERSEY

Article 1.  
This organization shall be known as THE AERO CLUB OF NEW BRUNSWICK, NEW JERSEY.

Article 2.  
This club is formed for the following purposes:—

- (1) To assist in furthering aviation activities in this vicinity.
- (2) To obtain for New Brunswick a municipal airport.
- (3) To secure legislation, to further commercial aviation.

All persons interested in aeronautics are eligible to membership.

Article 3.  
The membership of this organization shall consist of members known as active and associate members. The qualifications of each group is to be determined by the By-Laws.

Article 4.  
The administration of the club shall be in the hands of the duly elected officers hereinafter designated as the By-Laws.

Article 5.  
The Constitution may be amended at any meeting of the club by a vote of a majority of the members present provided

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## Blackburn Company of England Develops Long Range, Coastal Patrol Flying Boat

A RECENT design of the Blackburn Aeroplane & Motor Co., Ltd., Orpington, Kent, England, is the Blackburn "Iris II", a large, long range reconnaissance and coastal patrol flying boat powered with three Rolls-Royce 650 hp. engines. It carries an ordinary load of 3400 lb., in addition to 6000 lb. including crew and equipment, giving it a gross weight of 27,000 lb. With this load it is stated to have a high speed of 305 m.p.h., a cruising speed of 260 m.p.h., and a landing speed of 43.4 m.p.h. It climbs at 700 f.p.m. and is said to take off in 34 seconds. The service ceiling is 12,000 ft. At cruising speed it is said to have a range of 534 mi. and at high speed a range of 537 mi. It is stated that in the design of the hull 3400 lb. has been saved by constructing it of metal rather than of wood. Of this, 400 lb. was saved in the actual structure, the metal skinning previously 300 lb. due to water tanks.

As a military plane it is designed to carry a crew of five: a pilot, a navigator who also acts as gunner or second pilot,



Recently completed at Orpington, the Blackburn "Iris II" Military Flying Boat is powered by three Rolls-Royce 650 hp. engines.

a wireless operator, an engine gunner, and an additional gunner. A gun is mounted on a flexible mount on the nose in front of the cockpit. The interior of the hull is very light and roomy. An engine gunner is stationed in the rear, while the reference shows the wireless operator, with space behind him for five slung-back machine, stoves, etc. At the very end, below the rudder, a machine gun is provided for firing to the rear.

In construction, the hull is entirely of duralumin with the exception of the fittings for the wing and tail surface attachment which are of stainless steel. The hull is of two main sections with a section of bottom. The wing area is self-lifting by means of design and avoids construction using wooden spars and ribs, with the internal bracing of duralumin tubes for compression members and steel tie-rods. Three engines are installed between the wings, each below a fuel tank of 300 gal. These engines are mounted on a steel base structure.

## Post Office Department to Issue a New Series of Special Handling Stamps July 1

POSTMASTER GENERAL New has announced that, effective July 1, a new series of special handling stamps in denominations of 10, 25, and 50 cents will be issued by the Post Office Department to conform to the rules provided by recent postal legislation. These stamps will take the place of the 10 cent "air" stamp now in use.

The new stamps will be of the same size and shape as the current one and will have within a circle in the center of

each one the numerals "10", "25", and "50", with the words "special handling" arranged in a semicircle directly above. The background will be of greenish-buff color and the entire stamp will be enclosed within a straight line border. The color will be dark green.

## N.A.T. to Establish a Chicago-New York Passenger Service Within Eight Months

PASSENGER AIR service between Chicago, Toledo, Detroit, Cleveland, and New York is to be established within eight months by National Air Transport, Inc., according to an announcement by Col. Paul Henderson, vice president and general manager of the company. The Chicago-New York flight is to be made in seven hours, thus bettering the fastest time by 13 hr.

The first unit to be launched will consist of seven multi-engine planes, the type yet to be chosen, carrying 12 to 14 passengers, four pilots, and a radio observer, who will serve as a buffer back on route. The fleet of planes will cost \$500,000. The latest type of radio beacon guiding instruments will be used on the line. While it has not been definitely decided what firm will be chosen, Colonel Henderson said, "We will follow railroad practice and change route recently advanced to represent the line served near direct route of transportation. We have a man in Europe at the present time studying the latest developments on the foreign air lines and we will provide every luxury for the comfort and convenience of the passengers that they would expect to have on a modern Pullman train."

Planning of the new service reveals that National Air Transport will use \$500,000 of the new capital to buy 20,000 shares of Transcontinental Air Transport, Inc., stock. The latter concern was recently organized to operate a combined plane and rail service from New York to Los Angeles. It has been handling passengers on regularity via Glides on the southwestern domain for five months and has been handling passengers in emergency ever since the beginning of its operations in May 1937.

## Bids for Air Mail Service Linking Canada and United States to be Opened June 25

WITH ESTABLISHMENT of air mail service linking the United States and Canada approved by the Postmaster General, bids will be opened, it is announced, on June 25 for the carrying of mail by air on the proposed route from New York City to Montreal, one way for a period of 18 yr. The service is to begin not later than six months after award of the contract and will be for one trip daily except Sundays. The maximum load which may be required for a trip is 1,000 lb. and the approximate mileage 500 mi.

The act of March 3, 1926, under authority of which bids have been asked for this route, provides that the rate to be paid shall not exceed two dollars per mile. No bid, therefore, will be accepted at a higher rate than the maximum laid by law.

The Canadian government already has made a contract with the Colonial Canadian Air Lines, a subsidiary enterprise of the Colonial Air Transport, Inc., and the Colonial Western Airways, Inc., which have contracts from Boston to New York and Albany to Cleveland to provide for air mail service on the mentioned line from Montreal to New York.

The Department of the Interior said such bid must be accompanied by a bond of \$15,000. Contractors, furthermore, must make their arrangements for landing fields, radio stations and such other navigation aids.

## Air Mail on Contract Routes Increases From 171,028 Lb. to 199,284 Lb. in May

ACCORDING TO figures made public by Postmaster General, there was an increase of 28,256 lb. of mail carried over the 28 contract air mail routes throughout the country for the month of May 1938, as against the previous month. There was a total of 199,284 lb. of mail carried over the air mail routes during the month of May 1938, while for April 1938, the total in pounds was just 171,028.

The figures for the month, together with the weight in pounds of mail carried for May 1938 follow:

Route	Weight
Boston-New York	7,591
Chicago-St. Paul	3,393
Chicago-Kansas City-Dallas (day and night)	10,444
Salt Lake City-Portland	21,717
Salt Lake City-Tucson	7,471
Seattle-Cleveland	144
Denver-Chicago	2,524
San Francisco-Los Angeles	8,111
Chicago-Minneapolis	4,137
San Francisco-Pittsburgh	2,558
Chicago-Pauline	3,703
New York-Chicago	23,812
Chicago-San Francisco	24,604
San Francisco-Albany	8,506
Buffalo-Cleveland	3,373
Dallas-Denver	3,590
Dallas-New Orleans	2,680
Albany-New Orleans	2,145
Chicago-Cincinnati	2,575
Total	199,284

## Aviation is Used as Text in All Classes of the Western College of Aeronautics

THEORETICAL DISCUSSIONS of aviation problems, selected by recognized authorities in AVIATION, is considered as non-mathematics by the Western College of Aeronautics, Los Angeles, that it studies it has adapted this technique as the text in simultaneous aeronautical engineering in all classes.

Not only is the technique used in connection with the class at the school but in answering inquiries relative to how this course it has been the practice of the Western College authorities to recommend that the prospective student purchase the book "Modern Aeronautics" by Page and Schuckler to Aviation. The Western College of Aeronautics does not conduct a home study course and feels that the student may accomplish as much by a digest study of the texts mentioned as by the work involved in connection with the ordinary home study course to aviation.

Over 1,500 inquiries have come to the College for home study course and all have been advised to follow the course outlined.

## Cardinal Flyers of Louisville, Ky., Named Agent for Fairchild and Waco Airplanes

STRICTLY INCORPORATED at Louisville, Ky., the Cardinal Flyers organization has become Fairchild and Waco agent.

Much other activity is reported from Louisville. The city has named a local crew of \$700,000 to purchase Bowman Field for use as a municipal airport. Furthermore, the Aero Club of Kentucky, with headquarters at Louisville, announced the establishment of a landing field at Two-Pineville, Ky., and arrangements for another at Mammoth Cave.

## New Biggs Airplane Co., Bartlesville, Okla., To Manufacture Planes for Oil Field Work

A THIRD airplane company has been organized in Oklahoma to manufacture a plane suited for work in the Oklahoma and other oil fields. This company is known as the Barker-Biggs Airplane Co. and is to be located at Bartlesville, Okla. The other two companies are the Coffey Manufacturing Co. at Tulsa and the Aircraft Co. at Tulsa.

Billy Barker, aviator with the Phillips Petroleum Co., and A. B. Biggs, airplane designer and engineer, are to be the heads of the new company.

The charter for the new company has been issued and the factory and shop are now nearing completion at Bartlesville. The factory is located at the Phillips Petroleum Co. airport, west of the city, the operations of the company being the new concern.

Work on the factory is expected to be finished by July 30. No details as to the plane, designed by Biggs, have been released except that it is claimed to be sturdier and better fitted for the oil field work. It will be a monoplane.

## Data Released on the Napier Lion Engine Used in Plane Which Won Schneider Race

THE BRITISH Air Ministry recently released data on the Napier Lion racing engine used in the Supermarine seaplane which won the Schneider Trophy at Venice, Italy, last year, breaking the world's speed record at that time.

The engine is a 12 cylinder W type water cooled design, developing 875 hp. at 2200 r.p.m. It weighs 850 lb. or 385 lb. per h.p. It operates with a compression ratio of 18 to 1, using fuel with high latent content and 48 ps. per sq. in. inlet cylinder head. The engine head is of very clean design, with the cylinder heads and valve housing of streamline shape so that no cooling is necessary. The drag of the engine was increased by the addition of a protection grill having a ratio of 1.388 to 1. It is stated that the full engine is close to 50 gal. an hour.

## Air Cop



Thomas M. Swarth, sheriff of Multnomah County, Ore., demonstrates his new plane as an aerial deputy sheriff. Swarth has three planes at his command ready to hunt law breakers.



## Zenagage Company of Brussels, Belgium, Constructs All Metal Observation Plane

The Zenagage Aeronautical Construction Co. of Brussels, Belgium, has completed an all metal biplane for observation purposes. Powered with a 500 hp. Hispano-Suiza engine, the "Z.A.C.C.O." A-1 is stated to have a high speed of 158 m.p.h. and a landing speed of 40 m.p.h. The plane is a single two biplane of all metal construction using duralumin both for internal structure and for covering. The covering is of sheet metal riveted in place.

The upper wing is at a dihedral of 4 deg., while the lower wing has none. The wings are braced in 30 ft. cables in the most modern. Landing lights are mounted below the lower



The "Z.A.C.C.O." all metal biplane that has a high speed of 158 m.p.h.

wing to provide for night flying. The rear cockpit is fitted with two machine guns firing forward and one facing to the rear, with an additional gun for tracer bullets. Camera for photography and radio telephone apparatus have been installed. In order to compensate for any variation in load, the horizontal stabilizer is adjustable. The gasoline tanks are fitted with dump valves so that they may be emptied almost instantaneously.

The following data has been submitted on the Z.A.C.C.O.:

Span	.....	41 ft.
Length overall	.....	28.06 ft.
Height	.....	10.75 ft.
Wing area	.....	13.25 sq. ft.
Total area	.....	6.58 sq. ft.
Upper wing, dihedral 4°, area	.....	229.92 sq. ft.
Lower wing, dihedral 0°, area	.....	307.35 sq. ft.
Total area	.....	437.27 sq. ft.
Mean gap	.....	0.38 ft.
Chord	.....	6.1 ft.
Wing gap	.....	2.44 ft.
Angle of incidence of wings in ratio to axis of fuselage 3 deg.	.....	
Weight empty (with Hispano-Suiza 500 hp. engine)	.....	2772 lb.
including water	.....	3172 lb.
Empty load	.....	2792 lb.
Total weight	.....	4504 lb.
Climb to 15,000 ft. (one hour)	.....	36 min.
Climb to 10,000 ft. (one hour)	.....	24,000 ft.
Power loading	.....	0.27 lb./hp.
Wing loading	.....	0.107 lb./sq. ft.
High speed is at 158 m.p.h. (altitude 10,000 ft.)	.....	
Landing speed	.....	42 m.p.h.

## Thunderbird Aircraft, Inc., Los Angeles, Contracts for Consolidated Instruments

THE CONSOLIDATED Instrument Co. of America, Inc., New York City, has received a contract from the Thunderbird Aircraft, Inc., of Los Angeles, Calif., for complete Consolidated instrument equipment for one year. In addition to the Consolidated products, Thunderbird plans will be equipped with the Consolidated Type A indirect lighted aircraft instrument panel.

## Aeronautics Branch, Dept. of Commerce

### Issues 16 Experimental Airplane Licenses

THE AERONAUTICS Branch of the Department of Commerce has issued experimental airplane licenses to the following:

National Airways System, Los Angeles, Calif., for a three-place land type biplane—Wright Whorlwind engine.

Voltaire Aircraft, Seattle, Wash., Woodson construction—Aer-Cat.

Radi Aircraft Co., Marysville, Wash., Ebel biplane—Wright.

Willard Aircraft Co., Chicago, monoplane cabin monoplane—Anson.

Gray Harbor Airways Co., Aberdeen, Wash., three place semi-cantilever cabin monoplane—Kinner.

Benar Elchis Aircraft, Anderson, Ind., low wing monoplane—Harley-Davidson engine.

William F. Crawford, Long Beach, Calif., Crawford A-1 biplane.

The Douglas Aircraft Corp., Dallas, O., K-28—Kinner.

Irish Aircraft Co., Water & Mays Roads, Sandusky, O., three place high wing monoplane—Curtiss OX-5.

Curtiss Aeroplane & Motor Co., Garden City, N. Y., Curtiss biplane—OX-5.

Datta Airplane Co., Dayton, O., three place biplane, Curtiss OX-5.

O'Neill H. Holmes, Minneapolis, Minn., three place biplane—Blissman.

Curtiss Aeroplane & Motor Co., Garden City, N. Y., Curtiss three place cabin monoplane—OX-5.

North Star Aircraft Corp., St. Cloud, Minn., Liberty 3-4 biplane—Liberty engine.

John Henry Means, New York City, Fairchild FOC-Wasp.

## Twin Cities-Rochester Ford Plane Service

### Being Insaugurated by Jefferson Company

A DAILY passenger service between the Twin Cities and Rochester, Minn., the well known motorist, is being inaugurated by the Jefferson Highway Transportation Co. Its operation is Minneapolis. A Ford six-cylinder monoplane will be used on the approximately 45 min. run between the terminals. It is the intention to make two flights from the Twin Cities to Rochester each day, and during the days of the summer between the trips, engineering work will be made over the respective craft. This passenger service is expected to be used extensively by the large number of doctors traveling through the Twin Cities to Rochester from all parts of the country.

## Reduction in Aviation Insurance Premiums Is Announced by Barber & Baldwin, Inc.

FORTY TO 50 per cent. reduction in the aviation premium has been added to the regular premium on life policies. It is announced by Barber & Baldwin, Inc., aviation insurance underwriters.

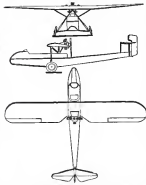
This action was taken after a careful review of the life insurance situation. Hereafter, the premium rate for life insurance and passengers on aircraft has been from \$10 to \$40 per thousand to cover the flying part of the insured. This reduction was added to the regular premium on the policy. The net premium has now been reduced and will range from \$5 to \$10 per thousand.

## Nes Koellhoven F.K. 30 Monoplane Built In the Netherlands Is Radical in Design

FREDERICK KOELLHOVEN, Dutch aeronautical engineer, has completed the Koellhoven F.K. 30, a quite radical type of monoplane. It is of rubber design, with the pilot and passenger sitting in front of the wing, the passenger in the rear close to the center of gravity. One of the most interesting features in the F.K. 30 is that instead of having the wing trailing, it is built in one piece, arranged to have round a corner and lay fore-and-aft along the fuselage.

The wing is supported by a pair of H struts mounted on a "nose ladder" fixed to the fuselage behind the cockpit. It is a fixed in position with a ground device.

The fuselage is exceptionally long and is rectangular in section with the lower segments in the rear portion sloped ending on the ground. The fuselage decreases in depth towards the rear.



Three views showing of Koellhoven monoplane

had the wing to give the proper clearance for the propeller. The vertical fin which supports the stabilizer is built around the fuselage. As the fuselage is set very low, the axis of the wheel is almost horizontal, with the shock absorber in the upper segment. Control and air are carried in the center section in front of the engine.

The first plane was built with a 60 hp. Armstrong-Siddley "Gem" engine, with provision for the installation of a 60 hp. Walker, or a 55 hp. Ryan-Sixman engine. With this power plant, it is stated to have a high speed of 98 m.p.h. Additional specifications are as follows:

Span	.....	20.0 ft.
Wing area	.....	144.4 sq. ft.
Wing span	.....	20.0 ft.
Wing empty	.....	700 lb.
Empty load	.....	700 lb.
Weight loaded	.....	1400 lb.

## Traffic Experts to Study Foreign Services As Step in Forming the T.A.T. Air-Rail Line

AN initial step toward organizing the Transcontinental Air Transport, Inc., several passenger service between New York and Los Angeles, Pennsylvania Railroad officials announce that two of the nation's most experienced traffic officers have been sent to Europe for the purpose of making an intensive study of the various systems of the Continent and England.

The two officers are Charles H. Mathews, Jr., assistant general traffic manager, whose office is in Philadelphia, and Maj. C. K. MacGowan, general passenger agent, Washington, D. C. (Chief) James transportation them. Their investigation, P.R.R. officials said, will be devoted particularly to questions of commercial arrangements, including the handling of baggage and problems involving the comfort and convenience of passengers with respect to airports and flying services.

The English railway will be studied first. The party then will fly to Amsterdam and thence to Berlin, where particular attention will be given to the methods and commercial organization of the German air passenger lines. The French system will be studied at La Moutte, Paris, and elsewhere throughout the country. A visit will be made to the Federal Republic of Germany, the American Embassy, which will open in Paris on June 20.

In addition to the trips arranged to the Swedish and Danish airports, the tour will be completed with a survey of the aviation centers of Switzerland and Italy. It is expected the party will return to the United States early in August.

## Many Conferences Arranged

Advance arrangements, which have been made for conferences in the various countries to be visited, include conferences with promoters of passenger flying throughout the Old World. Some of the conferences have been arranged as follows:

In England—Sir Edna Gidder of the Imperial Airways, London; Gen. Sir Nathan Bracken of the Imperial Airways and the British Air Ministry; Maj. A. S. Buchanan of the British Air Ministry; C. E. Farley of the Ferry Aviation Co.; A. H. Froben, managing director, British Aircraft Corp.; and A. V. Roe, president of the A. V. Roe Co., London.

In Holland—A. Ploosman, managing director of the Royal Dutch Air Lines; The Hague, and Amsterdam; H. van der Hagen, in France—P. A. Flamin, chairman of the Air Transport Committee, International Chamber of Commerce, Paris, and Louis Pignat, president of the Brupat Aviation Co. of Paris. In Germany—M. Wronski, managing director of Luft Hansa, Berlin. In Sweden—Capt. O. F. C. Florman, president of the Swedish Air Lines, Stockholm. In Denmark—Bentz Hans of Copenhagen.

## Technical Advice for Users of Acetylene Is Offered by International Association

TECHNICAL ADVICE is offered to the users of acetylene and various kinds of acetylene apparatus by the International Acetylene Association, 10 Bond Street, New York. The association has a technical engineering committee to handle any problems submitted regarding the installation, operation, and maintenance of acetylene apparatus. Occasionally new problems come up which require experience and consultation with engineers who operate in this subject, and it is stated that such problems will receive careful consideration by the technical engineering committee.

## REVIEWS

The book *Department Aviation*, 216 West 41st St., New York City, will be available in book form in the near future. It is a collection of articles on aviation as it should appear, report from the National Academy Committee for Aeronautical Publications, P. C.

German-English-English-German Dictionary of Military Terms and Phrases, by Kurt Hilmar Dietrich. Verlag Godesberg, Berlin. 425 pages.

It is claimed to be the first compilation of aeronautical terms in both German and English. It is meant to be used in the U. S. Infantry and Cavalry schools, in the Military Academy at West Point, N. Y., in post schools, etc., and by the officer interpreter. The author was a German trench officer during the World War.

Letters from a Flying Officer—by Railway Staff Worker. Oxford University Press, American Branch, New York. 206 pages. \$2.50.

A very interesting story of the experiences of the author during the World War as a pilot in No. 32 (Bristol Fighter) Squadron in France. It consists of letters and extracts from his diary from August, 1914, when he was a staff captain in the infantry, through the time when he joined the Flying Corps in 1917, up to his death in 1920. In March, 1918, he was awarded the Military Cross. The book was compiled by Buff Cooper and John Radhak. It describes in detail, in a vivid style, the exploits and experiences of the author and his companions and is therefore a history of the Flying Corps as active in the Western Front.

University of Toronto Bulletin No. 7. Aeronautical Papers by J. H. Perton.

Paper No. 16 includes a description of the new aerodynamic laboratory of the University of Toronto, with data on wind and turbulence, a variation in air flow and set up of the balance.

Paper No. 17, entitled "Research on Channel Wing Interference," goes into great detail on that subject and includes photographs, curves, and wind tunnel data.

Papers No. 18 and No. 19 are concerned with the investigation of the pressure distribution over U. S. A. 27 and Goettinger 387 airfoils with square wing tips.

Paper No. 19 is an investigation of biplanes, with data on pressure distribution on blue biplanes of wood, glass, metal, wire, and varying stagger and various airfoils, namely, American 4, U. S. A. 27, and Goettinger 387.

### Mid-Phase Company Inaugurating a Daily Minneapolis to Fargo Passenger Service

A DAILY passenger service between Minneapolis, Minn., and Fargo, N. D., is being inaugurated by the Mid-Phase Sales & Transit Co. of Minneapolis. This mid-phase airplane will have latest accessories for the comfort and welfare of the passengers will be used.

One Fairchild will leave each terminal in the morning, returning in the afternoon of the same day, thus making it possible to transact business at each point with the minimum loss of time. Two minute stops will be made en route at the towns Minnesota, Ohio St., Chow, Alexandria, and Fargo. Flights will be spaced time of about three hours having required for each trip, according to the present schedule. A rate of \$25 for office one way or round trip flights will be in effect at present, and if the passenger is as good as expected, then additional Fairchild will be placed in service with reduced rates.

### Air Service, Inc., of Minneapolis Offering Summer Aero Course to College Students

AN INTERESTING ground and flying course for college students is being offered during the summer months by the Air Service, Inc., of Minneapolis, Minn. This course is intended to give the students instruction in ground work, shop practice, and flying in order to prepare them for examination for Government licensed pilots.

As the school is located in the new building at 2141 of the Midway Aircraft Corp., manufacturers of the Midway Flyer, it is convenient for the students to take the various steps in the production of a plane. In addition, various instruments, old and new production engines, partly assembled wings and fuselages, and other necessary facilities for instructing the students, are on hand in well-equipped shops. These last facts are used so as to be able to keep pace with the rapid development of the industry. A. P. McCullough is the registrar of the Air Service School.

### Idaho Sheepman Buys Waco for Herding And a Ryan Monoplane for Visiting Cousins

ENDING SKEWER by airplane, first embodied in by John Brooks of Rupert, Idaho, is becoming more popular as evidenced by the buying of three planes by W. M. Anderson, another prominent sheepman of Idaho.

Anderson's planes are two Waco, to be used in an aviation school, two Waco, and small reconnaissance for visiting ground, and a Ryan, four passenger monoplane. The latter will be his private plane and in it he will visit his distant sheep ranch. These planes may be made by air in an hour, whereas by wagon or even truck, days are required.

Further use of the airplane in the West's life activities is expected as the ranch owners more fully realize the great value of aircraft in their work.

### A Sky Camera Grad



Hal S. Kennedy (right) of Fresno, Calif., is said to be the first graduate of a civilian school of aerial photography in the United States. Kennedy, shown here with Hal S. E. who, his instructor, became an aerial photographer, a red snapper, and pilot in one operation.

### Gegenbach Building is Formally Dedicated

At Massachusetts Institute of Technology THE DANIEL GEGENBACH Aeronautical Engineering Building was formally dedicated on June 4 by the Massachusetts Institute of Technology in Cambridge. Dr. Samuel F. Knoll, president of M.I.T., presided. He traced the development of aviation building at the Institute from 1904 to the present day and after thanking the Gegenbach Foundation on behalf of the Corporation of M.I.T. introduced Dr. F. Gegenbach. He told of a recent survey of aircraft manufacturing establishments which showed a present and greatly increasing future need of skilled aeronautical engineers, detailed the work of the Foundation, and spoke of the place of the new laboratory in the aeronautical future of M.I.T.

By James Howard Mease presented to Samuel Knoll, D.D., the James Mease Memorial Medal for his essay "In-



A group of celebrated aeronautical engineers and scholars gathered at the formal dedication of the Gegenbach building at MIT. In the front row (left to right) are: Rear Adm. Philip Anderson, Boston Navy Yard commandant; A. Lawrence Leitch, president of Harvard; Samuel F. Knoll, president of M.I.T.; Harry Gegenbach, Gegenbach Foundation president; and Edward F. Warner, Secretary of the Navy for Aeronautics.

communication Between Aircraft and the Ground", which was the annual undergraduate competition for the best essay. Academic Secretary of the Navy Edward F. Warner who flew to Boston to participate in the occasion and who is the head of the Aeronautical Engineering Department of M.I.T. in a house status with the Navy, declared that aeronautical instruction is relatively without the improving facilities of making in other professions and consequently is really more humble and obscure constantly with the advancement of the science of aviation. He declared the aviation instructor who follows a handbook and lecture year after year from a text book or old notes has no place in the profession.

About 400 persons attended the dedication ceremony at MIT which was held in the auditorium on the third floor. Interesting historical exhibits had been arranged in the various halls and rooms of the laboratory and the apparatus, tool trunks, library, museum, rigging room, and many special laboratories were open for the inspection of the guests.

### New Departure Company Issues Catalogue

GIVING DATA on various types of bearings A New catalogue has been published by the New Departure Co. of Grand Rapids, Mich., giving the dimensions, load ratings, price list, and telephone code for the various types of bearings manufactured by that company. These bearings

are being used on a number of engines and the New Departure Mfg. Co. is expanding its production facilities. It will be ready to start during the new New Departure bearings were made exclusively on the Liberty engine.

### Paul Branniff Air Transportation Taxi Co.

OF OKLAHOMA to Operate State Air Lines INCORPORATION PATENT have been taken out in the State of Oklahoma for the operations of the Paul Branniff Air Transportation Taxi Co.

F. C. Hall and Powell Brown of Chickasha, E. E. Wadsworth, Southwestern Bell Telephone Co., Ray H. Smith, Southwestern Bell Telephone Co., W. A. Lybrand of Tulsa, Okla., and Lybrand, attorneys; T. E. Russell of the Branniff Investment Co., and Paul Branniff are the incorporators of the new firm.

The company at present owns a Winson-Dietrich, a Ryan Brougham, and two new Travel Air planes. Continuous work has been started on a 14 plane hangar at the Oklahoma City field. This hangar besides accommodating the planes will also have pilot's room, lockers, and rooms for women and men, and a passenger waiting room.

The first line of the company is to be an Oklahoma City-Tulsa line, which is to be opened this month and on which a regular schedule is to be maintained. The company furthermore has set up and will maintain flying schools at Tulsa, Chickasha, and Oklahoma City.

The officers elected recently were: Paul Branniff, president; Lybrand, secretary; T. E. Hall, vice president; and Wadsworth, treasurer.

This is the second large airplane company to form at Oklahoma City within two weeks, the Oklahoma Air Transport Co. having a week previously announced their plans for establishing a 12 plane hangar with a state-wide air service at Oklahoma City.

### Four Civil Aeronautic Bulletins are Issued

By Department of Commerce Aero Branch ISSUANCE OF four civil aeronautics bulletins is announced by the Aeronautics Branch, Department of Commerce. They may be obtained from the Aeronautics Branch of Washington and are as follows:

Aeronautical Bulletin No. 3 (formerly Information Bulletin No. 10)—Aeronautics Trade Directory. Part 1, Consolidation; Part 2, Additions.

Aeronautics Bulletin No. 1 (formerly Information Bulletin No. 13)—Civil Aeronautics in the United States, Part 1, Development; Part 2, Department of Commerce Aeronautics.

Information Bulletin No. 21 (second edition)—Airports, types of management, rental, ownership, field rules.

Information Bulletin No. 20—Airport field regulations, effective May 1, 1939.

### American Air Transport to Conduct Air Passenger and Freight Service in Texas

THE AMERICAN AIR Transport Co. has opened ground office in the Adelphi Hotel Bldg., Dallas, Tex., to conduct its air passenger, freight, and express line from Dallas to Fort Worth, Wichita Falls, Amarillo, Ft. Worth, Lubbock, Midland, San Angelo, Abilene, and back to Fort Worth and Dallas.

This company will use the latest type of enclosed passenger planes and operate on regular schedule between these towns of North and West Texas, which are prominent centers for the oil, cattle, and agricultural districts. Their air line service will extend to any place a person or party wishes to go.

## Air Meet and Exhibit Will Feature Lowell, Mass., Airport Dedication June 21, 22, 23

IN WHAT an auspicious fashion will be New England's most pretentious aeronautical undertaking, the Lowell Airport at Lowell, Mass., will be formally dedicated on June 21, 22, and 23 with a combined air meet and aircraft and industrial exposition. The management of the meet and exposition is under the direction of the American Airports Corp. of New York acting in agent for the Lowell Airport Corp., of which Joseph A. Leggett is president and Geo. Butler Ames treasurer.

The exposition will be held in four large buildings at the field. The building holding the aircraft section is 408 ft. long and contains 36,000 sq. ft. of space. No charge is being made as the aviation section has space for aircraft or aircraft accessory display, the only cost to the exhibitor being for booth and space, for which the rate is \$50 per square ft. Inquiries for space and exhibits at most points are to be sent to the American Airports Corp. at the U. S. Courthouse Co. Building, 685 Lawrence St., Lowell, Mass.

The Boston & Maine Railroad has a spur running directly to the exposition building at the airport, and all exhibits located on this line will be delivered without charge except at the building.

General admission to the meet and exposition is \$1.00, which includes entry to the exhibit and \$1.00. The Boston & Maine Railroad, which has an aviation association, will run excursion to the field at single fare for the round trip from many points on its lines. On each day, the air meet and exposition will open at 10 A. M. and close at 10:30 P. M.

### Many Organizations Cooperating

Airplane organizations and committees cooperating are as follows: National Aeronautics Association, Boston Chapter, Aviation Committee of the Boston Chamber of Commerce, Aero Club of Massachusetts, Aviation Conference Committee of the New England Council, Air Corps Reserve Officers of New England, Aviation Committee of the American Legion, Department of Massachusetts, and the Aviation Committee of the Boston & Maine Railroad.

Cooperation has also been pledged by the Government War, Navy, and Commerce Departments. The War and Navy Departments will enter a number of planes in the air meet and will also have displays in the exposition, and authorization has been given for a visit of the dirigible Los Angeles at the airport dedication.

The Lowell Chamber of Commerce is preparing an exhibit to show the latest developments in aviation, Lowell offers to aircraft and other manufacturers. The entire Lowell exhibit in the various buildings will occupy 36,000 sq. ft. of space.

The Lowell Airport is but five minutes' ride by auto from the city hall. The North Lowell Station of the Boston & Maine line is at the northern entrance to the airport, while the Concord Station is at the western end.

## Cabin Planes to Meet in Special Rogers Cup Race at Lowell Airport Dedication

TO ENCOURAGE the development of aircraft from the standpoint of reducing aerodynamic resistance, a special commercial airplane race for the Rogers Cup will be held during the dedication of Lowell Airport, Lowell, Mass., on June 21, 22, and 23. The trophy and an additional prize has been donated by Congressman Edith Nease Rogers, who plans to present such an award each year.

Cloud cabin planes, each powered with the Whitehead

gas and bearing the same load in fuel and passengers as weight, are to compete in this year's event—a race for the fastest time over a closed course of 45 mi. With horsepower and loads equalized, it is pointed out that the winning plane will be outstanding in a credit of clean design and of least parasite resistance.

## First Annual Seaplane and Motor Boat Race to be Held at Rye, N. Y., July 11-12

AT PLAYLAND, Rye, N. Y., the First Annual Seaplane and Motor Boat Race Meet will be held on July 11 and 12. One of the largest performances of privately owned seaplanes is expected at the event by Fitz-William Belyndy and George W. Nelson, Jr., chairman, respectively, of the general committee in charge of the two sports represented in the competition. On each day of the meet, racing will start at 1 P. M. and continue until daylight.

Among the entries entered in date for the aviation section are many well known men and planes. Jack Trout, former naval aviator and now owner of the New Haven Air Terminal and Joe Kane of the City Island Airplane have entered Seaplane planes in the race of this class. Harry Rogers of Rogers Airway, Port Washington, has also entered several Seaplanes. All Seaplanes for this meet will be powered with the 250 hp. Curtiss G-B engine.

### Ireland Neptune Entered

G. Seymour has entered his Neptune Amphibian from Curran Field and this outfit is regarded as a dark horse in the type has never before competed in a race. The Neptune is powered with a Wright Whirlwind.

The Atlantic Airways of New York and Rye have entered an Aeromarine Model 30 flying boat powered with a 100 hp. engine. Another entry is an Alexander English seaplane powered with a new 175 hp. air cooled engine not as yet introduced to the public.

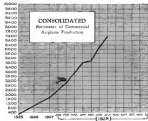
Only planes regularly licensed by the Department of Commerce are eligible for the race meet at Rye. All pilots must also have the annual sporting license of Federation Aeronautique Internationale, the governing body throughout the world for aviation matters. Any official records made during the Rye meet will receive international recognition automatically. The meet will be under the auspices of the National Aeronautics Association.

### The Aerial Program

The aerial program for the five days according to sequence of events is as follows:

- Wednesday, July 11, 1 P. M. Curtiss Day
1. Grand assembly of planes.
2. Free-for-all seaplane race up to 100 hp.
3. Dead stick landing contest.
4. Seaplane race up to 400 hp.
5. Free-for-all commercial seaplanes.
6. Parachute jump (woman).
7. Seaplane race.
- Thursday, July 12, 1 P. M. Service Day
1. Grand assembly of planes.
2. Match seaplane race for Admiral Joseph Smith Trophy.
3. Formation and combat flying.
4. Dead stick landing contest.
5. Handicap race for service planes.
6. Relay air race, service planes.
7. Parachute jump (woman).
8. Seaplane race for women pilots.
9. Visit of dirigible Los Angeles from Lakehurst, N. J. boat.

THE accompanying chart speaks the constant growth of airplane production . . . and the present approximate rate of manufacture (planes per 12-month period) . . . as indicated by the current delivery schedule of Consolidated Instruments.



## Consolidated Instrument Panel Standard on CURTISS "ROBIN"



### CONSOLIDATED INSTRUMENTS

- Altimeter
- Tachometer
- Oil Pressure Gauge
- Compass
- Temperature Gauges
- Air Speed Indicator
- Instrument Panel
- Gauge Gauges
- Fuel Structure
- Inductionmeter
- Globe
- Navigation Lights
- Landing Light
- Dark Light
- Air Pressure Gauge

CONSOLIDATED directly mounts panel type & depends on instruments effectively grouped in instrument panel.

THE "Robin", Curtiss' most ventures in quantity production of commercial airplanes, is equipped with the Consolidated Type A Aircraft Instrument Panel. In standardizing on this attractive, unobtrusively illuminated unit, Curtiss has provided up-to-the-minute advantages for those who will fly these graceful, fishing ships.

More and more, leading aircraft manufacturers are adopting this recently developed Consolidated Panel as the most convenient and efficient instrument equipment for their planes.

One or more Consolidated Instruments is standard equipment on most American commercial airplanes.

## CONSOLIDATED Instrument Company of America, Inc.

41 East 42nd St., New York

Western Representative  
M. E. Hulse, 5391 Broadway, Oakland, Calif.





# MANUFACTURERS' SPECIFICATIONS ON AMERICAN COMMERCE AIRPLANES AND SEAPLANES AS COMPILED BY AVIATION

THE TABLE BELOW IS BELIEVED TO BE ACCURATE BUT DOES NOT ASSUME RESPONSIBILITY FOR THE FIGURES GIVEN

Weights are in pounds

MANUFACTURER	Model	Year	Engine	Power	Wing Span	Length	Height	Weight	Max. Speed	Range	Climb	Altitude	Engine	Power	Wing Span	Length	Height	Weight	Max. Speed	Range	Climb	Altitude
Boeing	Model 1	1916	Boeing	150	35	28	10	1,500	100	1,000	1,000	10,000	Boeing	150	35	28	10	1,500	100	1,000	1,000	10,000
Curtiss	Model 2	1917	Curtiss	200	40	30	12	2,000	120	1,200	1,200	12,000	Curtiss	200	40	30	12	2,000	120	1,200	1,200	12,000
Wright	Model 3	1918	Wright	250	45	35	15	2,500	150	1,500	1,500	15,000	Wright	250	45	35	15	2,500	150	1,500	1,500	15,000
Lockheed	Model 4	1919	Lockheed	300	50	40	18	3,000	180	1,800	1,800	18,000	Lockheed	300	50	40	18	3,000	180	1,800	1,800	18,000
Stearman	Model 5	1920	Stearman	350	55	45	20	3,500	200	2,000	2,000	20,000	Stearman	350	55	45	20	3,500	200	2,000	2,000	20,000
Grumman	Model 6	1921	Grumman	400	60	50	22	4,000	220	2,200	2,200	22,000	Grumman	400	60	50	22	4,000	220	2,200	2,200	22,000
Northrop	Model 7	1922	Northrop	450	65	55	25	4,500	250	2,500	2,500	25,000	Northrop	450	65	55	25	4,500	250	2,500	2,500	25,000
Republic	Model 8	1923	Republic	500	70	60	28	5,000	280	2,800	2,800	28,000	Republic	500	70	60	28	5,000	280	2,800	2,800	28,000
Boeing	Model 9	1924	Boeing	550	75	65	30	5,500	300	3,000	3,000	30,000	Boeing	550	75	65	30	5,500	300	3,000	3,000	30,000
Curtiss	Model 10	1925	Curtiss	600	80	70	32	6,000	320	3,200	3,200	32,000	Curtiss	600	80	70	32	6,000	320	3,200	3,200	32,000
Wright	Model 11	1926	Wright	650	85	75	35	6,500	350	3,500	3,500	35,000	Wright	650	85	75	35	6,500	350	3,500	3,500	35,000
Lockheed	Model 12	1927	Lockheed	700	90	80	38	7,000	380	3,800	3,800	38,000	Lockheed	700	90	80	38	7,000	380	3,800	3,800	38,000
Stearman	Model 13	1928	Stearman	750	95	85	40	7,500	400	4,000	4,000	40,000	Stearman	750	95	85	40	7,500	400	4,000	4,000	40,000
Grumman	Model 14	1929	Grumman	800	100	90	42	8,000	420	4,200	4,200	42,000	Grumman	800	100	90	42	8,000	420	4,200	4,200	42,000
Northrop	Model 15	1930	Northrop	850	105	95	45	8,500	450	4,500	4,500	45,000	Northrop	850	105	95	45	8,500	450	4,500	4,500	45,000
Republic	Model 16	1931	Republic	900	110	100	48	9,000	480	4,800	4,800	48,000	Republic	900	110	100	48	9,000	480	4,800	4,800	48,000
Boeing	Model 17	1932	Boeing	950	115	105	50	9,500	500	5,000	5,000	50,000	Boeing	950	115	105	50	9,500	500	5,000	5,000	50,000
Curtiss	Model 18	1933	Curtiss	1,000	120	110	52	10,000	520	5,200	5,200	52,000	Curtiss	1,000	120	110	52	10,000	520	5,200	5,200	52,000
Wright	Model 19	1934	Wright	1,050	125	115	55	10,500	550	5,500	5,500	55,000	Wright	1,050	125	115	55	10,500	550	5,500	5,500	55,000
Lockheed	Model 20	1935	Lockheed	1,100	130	120	58	11,000	580	5,800	5,800	58,000	Lockheed	1,100	130	120	58	11,000	580	5,800	5,800	58,000
Stearman	Model 21	1936	Stearman	1,150	135	125	60	11,500	600	6,000	6,000	60,000	Stearman	1,150	135	125	60	11,500	600	6,000	6,000	60,000
Grumman	Model 22	1937	Grumman	1,200	140	130	62	12,000	620	6,200	6,200	62,000	Grumman	1,200	140	130	62	12,000	620	6,200	6,200	62,000
Northrop	Model 23	1938	Northrop	1,250	145	135	65	12,500	650	6,500	6,500	65,000	Northrop	1,250	145	135	65	12,500	650	6,500	6,500	65,000
Republic	Model 24	1939	Republic	1,300	150	140	68	13,000	680	6,800	6,800	68,000	Republic	1,300	150	140	68	13,000	680	6,800	6,800	68,000
Boeing	Model 25	1940	Boeing	1,350	155	145	70	13,500	700	7,000	7,000	70,000	Boeing	1,350	155	145	70	13,500	700	7,000	7,000	70,000
Curtiss	Model 26	1941	Curtiss	1,400	160	150	72	14,000	720	7,200	7,200	72,000	Curtiss	1,400	160	150	72	14,000	720	7,200	7,200	72,000
Wright	Model 27	1942	Wright	1,450	165	155	75	14,500	750	7,500	7,500	75,000	Wright	1,450	165	155	75	14,500	750	7,500	7,500	75,000
Lockheed	Model 28	1943	Lockheed	1,500	170	160	78	15,000	780	7,800	7,800	78,000	Lockheed	1,500	170	160	78	15,000	780	7,800	7,800	78,000
Stearman	Model 29	1944	Stearman	1,550	175	165	80	15,500	800	8,000	8,000	80,000	Stearman	1,550	175	165	80	15,500	800	8,000	8,000	80,000
Grumman	Model 30	1945	Grumman	1,600	180	170	82	16,000	820	8,200	8,200	82,000	Grumman	1,600	180	170	82	16,000	820	8,200	8,200	82,000
Northrop	Model 31	1946	Northrop	1,650	185	175	85	16,500	850	8,500	8,500	85,000	Northrop	1,650	185	175	85	16,500	850	8,500	8,500	85,000
Republic	Model 32	1947	Republic	1,700	190	180	88	17,000	880	8,800	8,800	88,000	Republic	1,700	190	180	88	17,000	880	8,800	8,800	88,000
Boeing	Model 33	1948	Boeing	1,750	195	185	90	17,500	900	9,000	9,000	90,000	Boeing	1,750	195	185	90	17,500	900	9,000	9,000	90,000
Curtiss	Model 34	1949	Curtiss	1,800	200	190	92	18,000	920	9,200	9,200	92,000	Curtiss	1,800	200	190	92	18,000	920	9,200	9,200	92,000
Wright	Model 35	1950	Wright	1,850	205	195	95	18,500	950	9,500	9,500	95,000	Wright	1,850	205	195	95	18,500	950	9,500	9,500	95,000
Lockheed	Model 36	1951	Lockheed	1,900	210	200	98	19,000	980	9,800	9,800	98,000	Lockheed	1,900	210	200	98	19,000	980	9,800	9,800	98,000
Stearman	Model 37	1952	Stearman	1,950	215	205	100	19,500	1,000	10,000	10,000	100,000	Stearman	1,950	215	205	100	19,500	1,000	10,000	10,000	100,000
Grumman	Model 38	1953	Grumman	2,000	220	210	102	20,000	1,020	10,200	10,200	102,000	Grumman	2,000	220	210	102	20,000	1,020	10,200	10,200	102,000
Northrop	Model 39	1954	Northrop	2,050	225	215	105	20,500	1,050	10,500	10,500	105,000	Northrop	2,050	225	215	105	20,500	1,050	10,500	10,500	105,000
Republic	Model 40	1955	Republic	2,100	230	220	108	21,000	1,080	10,800	10,800	108,000	Republic	2,100	230	220	108	21,000	1,080	10,800	10,800	108,000
Boeing	Model 41	1956	Boeing	2,150	235	225	110	21,500	1,100	11,000	11,000	110,000	Boeing	2,150	235	225	110	21,500	1,100	11,000	11,000	110,000
Curtiss	Model 42	1957	Curtiss	2,200	240	230	112	22,000	1,120	11,200	11,200	112,000	Curtiss	2,200	240	230	112	22,000	1,120	11,200	11,200	112,000
Wright	Model 43	1958	Wright	2,250	245	235	115	22,500	1,150	11,500	11,500	115,000	Wright	2,250	245	235	115	22,500	1,150	11,500	11,500	115,000
Lockheed	Model 44	1959	Lockheed	2,300	250	240	118	23,000	1,180	11,800	11,800	118,000	Lockheed	2,300	250	240	118	23,000	1,180	11,800	11,800	118,000
Stearman	Model 45	1960	Stearman	2,350	255	245	120	23,500	1,200	12,000	12,000	120,000	Stearman	2,350	255	245	120	23,500	1,200	12,000	12,000	120,000
Grumman	Model 46	1961	Grumman	2,400	260	250	122	24,000	1,220	12,200	12,200	122,000	Grumman	2,400	260	250	122	24,000	1,220	12,200	12,200	122,000
Northrop	Model 47	1962	Northrop	2,450	265	255	125	24,500	1,250	12,500	12,500	125,000	Northrop	2,450	265	255	125	24,500	1,250	12,500	12,500	125,000
Republic	Model 48	1963	Republic	2,500	270	260	128	25,000	1,280	12,800	12,800	128,000	Republic	2,500	270	260	128	25,000	1,280	12,800	12,800	128,000
Boeing	Model 49	1964	Boeing	2,550	275	265	130	25,500	1,300	13,000	13,000	130,000	Boeing	2,550	275	265	130	25,500	1,300	13,000	13,000	130,000
Curtiss	Model 50	1965	Curtiss	2,600	280	270	132	26,000	1,320	13,200	13,200	132,000	Curtiss	2,600	280	270	132	26,000	1,320	13,200	13,200	132,000
Wright	Model 51	1966	Wright	2,650	285	275	135	26,500	1,350	13,500	13,500	135,000	Wright	2,650	285	275	135	26,500	1,350	13,500	13,500	135,000
Lockheed	Model 52	1967	Lockheed	2,700	290	280	138	27,000	1,380	13,800	13,800	138,000	Lockheed	2,700	290	280	138	27,000	1,380	13,800	13,800	138,000
Stearman	Model 53	1968	Stearman	2,750	295	285	140	27,500	1,400	14,000	14,000	140,000	Stearman	2,750	295	285	140	27,500	1,400	14,000	14,000	140,000
Grumman	Model 54	1969	Grumman	2,800	300	290	142	28,000	1,420	14,200	14,200	142,000	Grumman	2,800	300	290	142	28,000	1,420	14,200	14,200	142,000
Northrop	Model 55	1970	Northrop	2,850	305	295	145	28,500	1,450	14,500	14,500	145,000	Northrop	2,850	305	295	145	28,500	1,450	14,500	14,500	145,000
Republic	Model 56	1971	Republic	2,900	310	300	148	29,000	1,480	14,800	14,800	148,000	Republic	2,900	310	300	148	29,000	1,480	14,800	14,800	148,000
Boeing	Model 57	1972	Boeing	2,950	315	305	150	29,500	1,500	15,000	15,000	150,000										

## Last Minute Briefs

According to a cablegram, Capt. George H. Gurn and Lt. Ben Erdson, who fly in three Vega planes from Point Barrow, Alaska, to Spitzbergen, will arrive on New York Coast On June 10. A tour of the country in their Lockheed plane is planned by the fliers.

As he goes to press, Capt. Pauline Garrison, Meane, Mass., has arrived at Bolling Field, Washington, D. C., having returned from Macarville, N. C., where he was brought down in his non-stop flight attempt from Meane City to the United States capital.

Oswald Schickel and his crew of 17 were, it developed, brought down in the druggable Italia at Northeast Land, some 200 miles north 200 mi. to the northwest of Kings Bay, Spitzbergen. Efforts are still being made at this writing to reach the explorers, who, it is said, have been divided into three groups by the treacherous ice on which they landed.

A new airport was recently established at New Orleans when the Louisiana Airways, Inc., and the Mercurius Lines, Inc., real estate dealer, combined from the Vietnam States Airport on the St. Bernard Highway (only a few miles from the city limit).

The Pilot Laboratories of Brooklyn, N. Y., which plans engineering and manufacturing research, have purchased a Stinson Detroiter plane especially built for such research work. The plane is being fitted with special experimental apparatus.

Dr. Frederick L. Hoffman, consulting statistician of the Presidential Economic Co., is undertaking an air trip to the Pacific Coast primarily to study aviation hazards and their relation to insurance.

Prof. Henry J. Cox, Government weather forecaster at Chicago, is to make a study of airport and meteorological stations in England and Ireland during July, with a view to learning the type of atmospheric weather service offered in these countries.

The Leaning Trophy aeromodeling air race, which was to have taken place at Mitchell Field, L. I., June 18, has been postponed until September 1. Residents will be given more time to qualify under the altitude competition.

Bessie J. Brinkley, Bill Airport manager at Lethro, Penna., has arranged his program to become associated with the Commercial Aviation Service. Her duties will consist of promoting, establishing, and managing airports in Pennsylvania.

Seven Salafino Field, Mead, officers have received orders transferring them to Northwest Field, Calif. They are Capt. James F. Wickard, Capt. Elmer E. Brown, Capt. Eugene C. Brown, Capt. H. H. Brown, Capt. H. H. Brown, Capt. H. H. Brown, Capt. H. H. Brown.

Charles Reed and Ralph Hall have tested 12 times between New York and San Angeles by plane in a pathfinding tour to determine the route of the New York-Los Angeles air ferry which is to provide the international air route on the Pacific Coast in September.

The Detroit Air Appliance Co., manufacturer of light pressure injection starters for aero engines, announces that the firm's name has been changed to the Heywood Street Corp.

Work on New York's municipal airport at Barnes Field was begun on June 12. Design will cost \$450,000 and is at work on the field.

A world's record for indoor flight duration of a triaxial model plane has been established by Carl V. Carlson, 25 yr old Chicagoan. Carlson's plane remained in the air 4 min 10 sec. in a recent bid at the 330 Infantry Armory, Chicago.

Bracewell Harris Douglas, member of the Senate Committee on Military Affairs and sponsor of a five year air program for the United States, will sail for Europe on July 1 to study development of aircraft and airports in France, England, and Italy.

Omaha-red runs, which it is said will be visible to pilots 300 or distant, are to be met by the new Lloyd Island, to be erected upon the Broadway Triangle in New York City.

R. Russell Shaw Co., Inc., St. Louis airport engineering firm, has been awarded a contract by the City of St. Louis, Mo., to design and supervise construction of a municipal airport. The city would like recommended a bond issue of \$100,000 for the fund.

Twenty-two weather observation posts are to be established by the Guggenheim Fund between San Francisco and Los Angeles and between the Pacific Coast and the South Atlantic to supply information for the Western Air Express line.

Jeanne A. Hunsinger, vice president of the Bell Telephone Laboratories, has been named as third member of the T.A.T. technical committee of which Colonel Lindbergh is head. Charles G. "Doc" Jones was named some time ago. Hunsinger is to receive a two-way radio to plane communication system.

R. W. Ireland, general traffic manager of the N.E.T., and H. H. Ireland of the Air Corps, have completed arrangements for 18 by Washington to Brink, Wis., air mail service for the use of the President during his vacation at Brink.

National Air Transport, Inc., has built a new office building at the Municipal Airport, Chicago, which is to house the principal offices of the company. The Treasury of Traffic office will be located in room 3015, Madison Building, Chicago.

Having completed and flown an experimental model plane, production is being started by the Emerson Works Aircraft Corp., Glendale, L. I., N. Y. An article mentioning the "Bird", the company's open cockpit biplane, will shortly appear in Aviation.

Announcement from the Office of the Chief of the Air Corps states that no surplus bomber material is available for release. All materials will be utilized during the five year period of expansion.

Three Beechcraft have received their new Bellanca monoplane a craft similar to the Martinsyde Bellanca in which Chamberlain and Williams made several duration attempts last winter. A World War I Bellanca powers the plane.

## Order for 105 Pratt & Whitney Horstons

And 10 Wings Placed by Boeing Company  
AN ORDER for 105 Pratt & Whitney 500 hp. Horston engines and 10 of the 400 hp. Wing engines was recently placed by the Boeing Aircraft Co. of Seattle, Wash. Negotiations with the Pratt & Whitney Aircraft Co. were concluded at the company's plant in Hartford by P. G. Johnson, president of the Boeing Aircraft Co., and Edward Hallock, assistant manager of the Boeing Air Transport Co.

Since July 1, 1937, Boeing Air Transport has operated the transcontinental air mail from Chicago to San Francisco, using Boeing mail planes equipped with Pratt & Whitney Wing and Horston engines. A short time ago Boeing took over the Pacific Air Transport, which operates the mail and passenger routes from Los Angeles to Seattle. Still two other extensions are being planned by Boeing Air Transport. They are now operating about 6000 sq. daily and it is expected that this will be increased to approximately 8000 sq. in the near future.

The unitary value of the engines just purchased from the Pratt & Whitney Aircraft Co. is approximately \$1,000,000 and constitutes the largest order for commercial equipment of record. While some of the additional engines will be placed in single engine mail planes a number of the Horstons will be used in two-engine air liners capable of carrying 10 passengers, with baggage, a thousand pounds of mail or express, together with two pilots. These air liners are presently for passenger carrying between Chicago and San Francisco but will also be used in connection with some of the planes for new routes.

## Packard Electric Co. Executives Touring

The Country in Stinson-Detroiter Plane  
EXECUTIVES of the Packard Electric Co. of Warren, O., are now touring the country in the firm's new passenger Stinson-Detroiter visiting factory branches and selling on wholesale distribution. The party arrived at Mitchell Field, N. Y., Friday June 8 and extended a dinner and suite staying at the Hotel Manhattan, New York City. Thence to the party with: S. A. Wolcott, president of the Packard company; B. R. MacGregor, sales manager of the same division; John S. King of Cleveland, advertising manager; and Louis M. B. Shadley, pilot and aircraft engineer. Formerly a member of the 28th Infantry, Springfield, following the New York week, the flying schedule called for flights to Newark, N. J., Philadelphia, Penn., Baltimore, Md., Washington, D. C., and Harrisburg, Penn., for further connections and dinners with company representatives. Returning to Ohio from Pennsylvania, the group plans to fly to San Francisco, Calif.

John S. King, advertising executive of the party, has purchased a Stinson-Detroiter biplane for service to clients of his Cleveland agency. King did observation and inspection work during the World War.

## Chicago-St. Louis Ford Airplane Passenger Service Being Formed by Robertson Company

ORGANIZATION of a passenger service between St. Louis and Chicago, with scheduled Ford aeroplanes making two trips daily between the cities, has been announced by the Robertson Aircraft Corp. of St. Louis, holder of the St. Louis-Chicago and St. Louis-Oakland air mail contracts.

The new service will begin on August 1 under present plans and service to Omaha, extending with the new equipment line in Kansas City and the Boeing biplane mail line at Omaha, will be inaugurated later. The first of a projected fleet of 14 airplanes—four Ford monoplanes—has been ordered and are scheduled for delivery on July 15.



## For The Discriminating Purchaser:

## THE AIRSEDAN

AIRLINE OPERATORS will find this plane meets with all their requirements. The cabin has exceptionally comfortable seats for four large passengers and the pilot's visibility is unexcelled.

PRIVATE OWNERS will approve of the fine appointments which are selected to satisfy the most critical taste.

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Passenger	700,000
Passenger miles	750,000
Total traffic figures for Pacific Air Transport, since be- ginning of operations Sept. 1, 1935 to May 1, 1938:	
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cycle engine is an air cooled power plant of eight cylinders.

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## Aero Club of New Brunswick

Continued from page 1763

at such notice of the association or associations proposed shall have been sent to the membership at least twenty days before such meeting. It shall be the duty of the Secretary to send such notices to the members when so ordered by the President or any other officer of the club at which twenty members of the club shall so request in writing. Votes and the proposed association or the election of officers may be deposited with the Secretary at any time before the meeting and by him read for each absent voter at the meeting. The ballot shall be in writing.

### BY-LAWS

#### Article 1.

##### Membership

(1) The membership is divided into two classes—active members and associate members.

(a) An active member is a member who contributes and who takes an active part in the flying activities that the club endorses.

(b) Associate members are members who take a general interest in aeronautics.

(2) Any person a resident of the State of New Jersey is eligible to membership in this club.

#### Article 2.

##### Dues

Dues for all members shall be Five (\$5.00) Dollars per annum.

Active members shall contribute in addition to the dues of Five (\$5.00) Dollars the sum of Two Dollars (\$2.00) Dollars to become such active member which contribution shall be the only requirement to become such active member.

Dues shall be payable in advance and payable after the first year.

#### Article 3.

##### Election of Members

Any person who shall pay his dues shall become eligible to membership.

#### Article 4.

##### Notice to Members

Every member shall leave with the Secretary his mailing address where all notices may be mailed to him.

#### Article 5.

##### Nomination of Officers

Nominations for officers shall be made at the regular November meeting of each year directly from the floor by members of the organization then present at the meeting and the election of such officers shall take place at the regular December meeting. Officers elected shall take charge and be installed at the regular meeting in January. All officers are elected for one calendar year.

#### Article 6.

##### Officers

The officers of this club shall consist of the President and the Vice Presidents, a Secretary and a Treasurer, an auditor, committee shall be appointed by the President.

President (a) It shall be the duty of the President to preside at all meetings and to see that order is maintained and the regular routine and duties of the organization are carried out. In the case of a tie vote he shall determine the vote.

Vice President (b) In the absence of the President the Vice President shall be seated with the duties of the President.

Secretary (c) It shall be the duty of the Secretary to keep accurate records of this association and to record the same in books to be kept for their purpose. He shall keep an accurate record of the addresses of the members and notify members of the meetings and of any changes in the Constitution and By-Laws.

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**Treasurer** (d) It shall be the duty of the Treasurer to receive all moneys paid into the club from all sources whatsoever and to deposit the same to the account of the Association at the New Riverbank Trust Company and at the direction of the Association to pay all orders or drafts against the club. Such orders to be paid by checks drawn on said bank and such checks to be signed by himself together with any officer. He shall at each regular meeting report to the club the amount of money received in the Treasury unexpended, and "shall show receipts and expenditures. Any two officers of the Association is sign checks." "Amendments"

**Auditing Committee** (e) The auditing committee shall be represented by the President and shall hold office for the term of one year. They shall annually make a thorough audit and inspection of the books of the Secretary and Treasurer and report their findings to the club.

#### Article 7 Meetings

The club shall meet every fourth Tuesday of each month. Special meetings of the club may be called by any two officers or any two members of the organization by requesting the same in writing and presenting personally to the Secretary such request. Such action should be presented to the Secretary within ten days of the time such meeting is desired.

#### Article 8

The order of business of the club shall be—

- (1) The reading of the minutes of the previous meeting
- (2) Treasurer's report
- (3) Report of standing committees
- (4) Report of special committees
- (5) Old business
- (6) New business
- (7) Adjournment

The order of business may be changed at any time by a majority of the members present at a meeting.

#### Article 9 Amendments

These By-Laws may be amended on twenty days notice, by the majority of the members present at such meeting. The Secretary shall send out notices giving such notice a twenty days notice of such proposed amendments to the By-Laws.

## The Wallace Tourplane

Continued from page 1754

In the sides of the center section, which project beyond the fuselage, are the fuel tanks of 14 gal each. Thus the entire fuel load is carried outside the fuselage just on the outer edge of gravity and all fuel lines are outside the engine. However, if larger engines are used, an additional tank is carried in the front of the fuselage. The center section spans are of greater depth than those of the outer wing panels. They are level with the tops of the wing struts at the tips while those in the outer panels are mounted between the top and bottom of the ribs, so a spar the full depth of the wing would be too heavy. The entire upper part of the center section is covered with beryllium copper, which explains the entire section being white. The lower part of the front spar is set away to a depth of two inches under the fuselage to permit better views. Rounded tie rods are run along each spar, through the outer section, connecting the wing hinges.

The external wing braces are of streamline Kanawha steel tubing, welded along the trailing edge. It is radiused along for protection and appearance. Internal panels are used in

where necessary to the wings in the case of both struts, and to the fuselage in the case of the rear strut.

The fuselage is rectangular in section with fair longitudes and built from bracing and wires. The members are all welded steel tubing with more smaller than 5/8 in. by 3/16 in. in the side rails or in the engine mount. The smallest members in the top and bottom rails are 1/2 in. by 3/16 in. The tubes in the bottom rails, to which the wing bracing are attached, are reinforced with 7/16 in. strands. The rear of the upper part of the fuselage, or fuselage deck, is built up of square cap strips. The fabric covering is suspended from the structure by felt strips. The engine mount, on the front, is of welded steel tubing. It is pinned to the fuselage at four points with crystal steel bolts and is readily detachable for the substitution of another engine.

A side by side seating arrangement, with dual control, is used in both places. In the larger model the third seat is added to the rear and in the center of the cabin. There is a one inch space between the two forward seats. The seats are heavily upholstered and quite comfortable. Safety belts are provided and there are metal braces for tools under the forward seats. By folding up the rear seat, a baggage rack



Side view of the Wallace Tourplane.

Side panel of the fuselage, allowing easy entrance or exit. Triple safety glass windows are used, giving ample views in all directions. The doors are covered with insulation and the walls are insulated to double sound and keep out extreme temperatures. There is a door using light in addition to the overhead light on the flying and instrument board. All standard refinements are provided, as required by the Department of Commerce. Only one tank is used for the fuel control, though there are two pairs of rubber pads. The tank has a short access member at the top so that it is convenient to both seats. Two fuelcocks are provided, one on each side of the fuselage. The rubber pads control is quite simple; the fuel rails are mounted of water on the pad columns. Normally the fuel is in the wheel tanks, one side only; but when it is desired to use the wheel tanks, one side only is shut towards the outside and then turns the pad, whenever the tanks through a series of valves and bell cranks with an Airflow control mounted on the fuselage wheel. The pads rotate the rudder through cables in the usual manner. Push rods and bell cranks are used for the other controls except the rudder adjustment, which employs an Airflow control mounted from the inside of the cockpit. All the controls are hidden below the flooring.

The control surfaces are constructed of welded steel tubing, the rudder and fin being interchangeable. The fin and horizontal stabilizers are made in the same jig but use different bracing.

The landing gear is of the divided type employing an wheel and spring type shock absorber. The members are attached to the fuselage longitudinally, and mounted with universal joints with legs of cast manganese bronze. It is claimed that by having the shock absorber with universal joints, the fuselage



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all the nearby fuselage members. The members of this legend are usually very short and  $\frac{1}{4}$  or  $\frac{1}{2}$  in. tubes are plenty strong enough to make the loads and make the loading diagram right.

In many places there are connections in the fuselage structure. That is the outer lines of members meeting at a point, point, do not all pass through the same point. When one member's end line passes some distance away from the point of connection of the other member line it suggests a considerable moment on that member. This is especially true of loads transmitted from the wings to the fuselage. These loads are so large that even a small eccentricity may cause considerable trouble. It is quite essential then that the loaded end of the span be in a direct line with the members carrying the span loads across the fuselage. Where connections are present it may be assumed there are some in solving for the stress major conditions but the bending due to them need be taken into account in the design of the affected members.

We have explained that several members must be transmitted for carrying the wing loads across the fuselage. In loading with side load several members are also affected by large loads which they do not have in any other condition. Members 46, 56, and 59 in particular are affected by this condition. In one place these members have been made sufficiently large to care for any possible loads.

**Design of Fuselage Members.**  
The fuselage will be designed for a coefficient of resistance of 2. This is the value allowed for a welded fuselage. Due to a typographical error a value of 0.5 for welded fuselages was given in Chapter 13. This value is much too high.  $C = 2$  being the correct value. For the engine mount a value of 0.5 in. is used because usually this part is made detachable and one end of the strain is passed. Perhaps  $C = 1\frac{1}{2}$  would be a better value but a little extra strength in this portion of the plane is not unwelcome. The charts of Fig.

27 to 41 of this series were used in designing the fuselage members.

The key to the members of the members used in the table is that given in Fig. 71 of Chapter 13. The loads listed in the table are those obtained from an analysis in the figures of the last three chapters. The loads obtained in the figures and under conditions are made plain in notes below. If the load were acting on the other direction on these sections that that we assumed all the loads in the members would be put reversed in sign. The design condition and load that come that in which the member is most severely stressed. Usually the design condition is in compression because under this type of stress a tube is less strong than when in tension. Sometimes however the maximum compression load is apparently smaller than the maximum tension load as in members 56, 57, and 59 of the table. In these cases the tube is riveted for both types of stress.

The lengths of the members may be measured off an accurately drawn diagram of the fuselage structure. As is noted in the original design of the plane all members but the engine mount would be chosen approximately steel tubing. The engine mount is mild carbon steel (1825).

In determining the use of the lightweight an effort has been made to require as few different sizes as possible. In all design using long lengths of one size of tubing seems more wide and makes the entire proposition of having up the fuselage much easier. The distribution of stress in the additional weight of using tubes a little over strength. This increase in weight is small however compared to the whole structural weight of the plane. In the case of the lightweight in the plane it probably doesn't make more than two pounds additional weight.

On small places the size of tubes denoted by the steel loads which they carry over, as so small that practical considerations demand that they be made larger. Bending con-

side cases in particular must be taken into account. The top member of Converter has set a maximum size and was in place for various reasons. No structural tube may be used 20 years (1935 will be reached). This is the present best value due to working or bending of the wall is small. For welded fuselages the maximum size of tubing to be used except in places weighing less than 3000 lb. are:

$\frac{1}{2}$  x .025 for the lightweight and web members of the side beams and members of the engine mounting.

$\frac{1}{2}$  x .035 for web members of the top and bottom beams. These sizes are minimum sizes when the length of the member does not exceed 30 to 50 in. In one place many of the tubes exceed this length and the maximum sizes have been increased an eighth of an inch in many cases. The necessity of using at least a printed size of tubing in the reason for the large margin of safety of the members. Good designs and small margins of safety to save weight but other considerations are more important than weight saving as has just been explained.

The loads in the top and bottom beams are fairly small and in many locations the maximum size of tubing may be used around the cabin however it is advisable to use larger tubes in these areas for large loads, larger loads, wing loads, etc.

Member 30, the tail post, is usually aligned with the rudder post. It is best then to wait until the tail section design is rudder post before assigning a size to this member.

The members around post 33L carry the tail skid loads and therefore must be made large. Member 37 and 40 in particular carry the loads of the skid in landing and are made accordingly for this purpose.

It must be remembered that the loads in low incidence must also be added in the table. We have not done so because to save time and space we did not analyze this condition as it was quite near to high incidence. Some of the design loads as we have them listed may not be true but for all practical purposes we have assumed that they are.

The size of the diagonal members 55 to 64 may be determined by a tabular method which is too advanced for the present article. It is the usual procedure to make them the same size as the surrounding members. Especially for a plane of our size this is perfectly true as we want on a minimum size of tubing which is in low incidence or over strength. We have therefore made these members  $\frac{1}{2}$  x .025 which will make the rest of the fuselage rigid against the torsional loads of the tail. This completes the design of the members of the fuselage.

In the next chapter the control surfaces, the tail skid, and the shock absorbing system will be designed. This will give the analysis of the plane as required by the Department of Commerce.

Acknowledgment is made by the authors for the use of Air Corps publications as follows:

Date of Air Corps Publication	Fig.	Page	No.	Alt. Corps Publication
April 2, 1928	38	32	56	Handbook of Instructions for Airplane Designers
April 9	40	4-45	352	Airplane Design, 1928
	43	4-48	354	Airplane Design, 1928
	44	4-47	358	Airplane Design, 1928
April 9	3	3-11	353	Airplane Design, 1928
	4	3-12	354	Airplane Design, 1928
	5	3-15	367	Airplane Design, 1928
	6	3-20	379	Airplane Design, 1928
	7	3-23	385-386	Airplane Design, 1928

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To be continued in the next issue of AVIATION

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on a beach, upon making embarking and disembarking quite comfortable.

Edo draught added from water coming very easy and this is an important feature in seaplane operation. Good buoyability is secured by large side floats of the Brougham, in conjunction with the wing and the hull of the Brougham, provide very comfortable riding for passengers going on or out of the water. The ship is so built that the hull floats in the water and the hull floats in the water and the hull floats in the water.

the Brougham and engine on a small water, thus allowing the Brougham to be moved in open and shallow water of the trouble of frequent beaching which would hinder operation.



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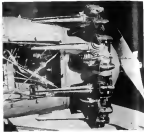
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## Engine Exhaust Silencers

Continued from page 1793

drawing the burned gases from the cylinders at a faster rate than normal and in this way increase the speed of the engine and the power. The Venturi type of muffler, which is rapidly becoming more popular because of its high efficiency, can do this. It consists of a venturi tube exposed to the atmosphere and surrounded by an expansion chamber connected to the exhaust manifold. The exhaust gases enter the expansion chamber which serves to regulate and slowly reduce their pressure. From there they are sucked into the Venturi, which is at less than atmospheric pressure because of the high velocity of the atmosphere passing through it. From the inside of the Venturi the gases rush out into the air current. Flaming gases enter the Venturi and are completely burned before they exit from the muffler, converting the flames from exterior view. The first Venturi type of muffler is understood to have been used on many automobiles about 20 yrs. ago.

Perhaps the best known airplane muffler of this type is the "R.H." muffler, and extremely broad and manufactured by Robert & Hartman, Paris, France. It consists of a small cylinder with the exhaust manifold pipe welded to one side. Inside the cylinder is a sort of Venturi with the back portion perforated with small holes or gills. The ends are open to the air so that when the airplane is in flight or the device is in the shoproom, air passes through the Venturi, creating a negative pressure in the rear walls where the gills are located. The negative pressure increases the velocity of the exhaust gases inside the device and the gases leave through the small gills and mix with the air that has entered the front end of the device. The fresh air circulation, in part, is the combustion of the gases on their entrance from the gills.



The Curtiss "Twin and Improved" type of exhaust on a Pratt & Whitney "Twin" engine installed on a Curtiss "Blender".

This takes place inside the muffler so that the flame of the burning gases cannot be distinguished from the cockpit. As according to the manufacturers, the noise of the exhaust is eliminated and the pilot and passengers can converse in absolute silence. The slow and high speed of a plane is almost identical with and without the R.H. muffler, the difference being so

June 18, 1928

slight that it is negligible. The muffler weighs 28-35 lb. and two of them, one on each cylinder bank, installed on a Hispano-Suiza 700 hp. engine weigh 55 lb. with complete manifolding. The muffler is 2 ft. 8 1/2 in. long and has an overall diameter of 8 1/2 in. The smallest diameter of the outer tube, at bottom, is 2 1/2 in. The ports are 7/8 in. from the front end. The muffler installed in the Loening commercial amphibian is of the Venturi type combined with the swirl type. A single muffler is used, connected to the top of the exhaust manifold behind the cylinders of the Wasp engine. The muffler is slightly larger than the R.H. type, at only one in. more free



of the cylinders. The installation weighs 55 lb. complete with exhaust manifolding. It should be noted that the muffler is some distance from the engine, above the upper wing, and is connected by a large pipe. Its design, it considers the R.H. type except for a few details. The gills have been replaced by small holes and the shape of the Venturi has been simplified. The exhaust manifold, instead of being connected to the expansion chamber continuously, is connected on one side so that the gases enter tangentially and swirl in the expansion chamber. A baffle in the expansion chamber also tends to induce these eddies. On the ground, with the muffler in the shoproom, it increased the speed of the Pratt & Whitney 800 hp. Wasp engine from 1600 to 1680 r.p.m.

A somewhat similar muffler is that designed for the Army a few years ago by the Dayton-Wright Aircraft Co. This consists of a cylindrical body of steel welded with both ends left open. Inside is a modified Venturi of sheet metal perforated with small holes. The space between the Venturi and the outside shell of metal is called the expansion chamber. This has the exhaust pipe connected to it at an angle



Drawing of the French "R.H." muffler. Translation: gas in exhaust pipe, gases in gills, swirl the gas at the back end of the gases and air.

with so that the gases swirl at the chamber. In operation it is exactly the same as the types described above. It is this streamlining and somewhat cheaper to make as it consists of two sheets of metal welded together at the ends and a pipe connected to the exhaust manifold. An experiment by 11 villages of this type has been placed in a Fairchild biplane, and though the noise was decreased considerably, the power loss and weight was thought too great to warrant its installation on standard equipment. Two mufflers of this type—one mounted on each side of the engine and the other used to have caused an increase in back pressure in the



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of many aeronautical engineers and it is supposed before long that the commercial passenger plane with a moving nose will be a thing of the past. There seems to be little hope of total elimination of the noise of the propeller. However, noise abatement is being worked on with some consistency as for the comfort of the passengers and noise is being reduced either by silencing the exhaust or by proper positioning of the nose and location of windows to the insulation in the walls of the cabin.

## Aircraft Radio Beacon Development

Continued from page 1768

be equipped with visible radio receiving sets, including visual indicators, so that practical flying tests by these air controllers may be carried out. Much valuable information is expected to result from these service flights, not only as the beacon operates but also on the practical handling of weather broadcasts in aircraft at night.

The beacon operates in the frequency band 295 to 305 kc., and the telephone stations in the band of 215 to 250 kc., as allocated to air service by the 1927 International Radio Convention. For the present the beacons are adjusted to the frequency of 290 kc., and the telephone stations to 330 kc.

The Bureau's work of the past year or so has been largely directed to the effort to replace the aural method by a practical visual method. The use of telephone receivers and discrimination of beacons by distinguishing various audio signals requires skill and entails a certain stress upon the pilot. This would be eliminated if a method could be devised which required no listening but only an occasional glance at the instrument panel.

The Army engineers worked out a visual system in 1923, which incorporated an arrangement of lights and lights on the interfacing signal beacons. This was not found to be practical under flight conditions.

The Service at Standards has experimented with a number of possible visual indication systems, most of them involving the use of two different modulating frequencies for the two ground loop antennas. The modulated radio frequency is on the antenna continuously, instead of flowing from one to the other antenna as in the aural system. This permits the use of continuously indicating instruments on the airplane. If the airplane goes off in one side of the course, the intensity of one of the modulated waves will increase and the other decrease, owing to the directive action of the two soil antennas.

It is required that a device be used in conjunction with the receiving set on the airplane which will give a visual indication of the relative amounts of the two modulated waves received. This requires some form of tuning to these two modulation frequencies. In several devices tried, the tuning was secured by means of tuned circuits attached to the output of the receiving set. Modulation frequencies of 500 and 1000 cycles were used.

One form of indicator consisted of a pair of neon glow lamps. One of these was in each tuned circuit. They were so adjusted as to just light up when the airplane was on its course and they remained aglow slightly. Because of the electrical response voltage, they gave a rather sharp indication when the voltage of either tuned circuit dropped. In most forms of indicator the two tuned circuits were connected directly to a meter and direct-current galvanometer. When the airplane was on the course and the receiver is tuned to the two tuned circuits, the dc output balanced and the galvanometer needle remained in the center of the scale. Any deviation to either side of the galvanometer needle was

always high. These forms of indicator were found too slow and too complicated for practical use. The dc output was used recently developed, which is likely to be adopted, consists of two vibrating steel rods. Their vibrations give the visual indication and they themselves provide the primary tuning to the two modulation frequencies. The vibrator is very simple and practical, merely being connected to the receiving set in place of telephone receiver. When the beacon signal is received the two rods vibrate. The tip of the rods are white, with a dark background behind them so that when vibrating they appear as a vertical white line. The rod on the pilot's left is tuned to a frequency of 5 cycles and the one on the right to 60 cycles. It is only necessary for the pilot to watch the two white lines projected



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A vibrating rod indicator.

to the vibrating rods. If they are equal in length, he is on his correct course. If the one on his right becomes longer than the other, the airplane has drifted off the course to the right (into the region where there is more of the 60 cycles). It is built off the course to the left, the white line on the 50 becomes longer.

The directive radio beacon station is usually located at an airport, just off the landing field. It employs two loop antennas crossed at an angle of 90 deg. with each other. Each of the coils is set of wires which is connected to the line and a minimum of right angle there. Both antennas transmit 200-kilocycle waves but modulated at two different frequencies. A master oscillator producing 200-kilocycle current feeds two power amplifiers. These are modulated by the two loop antennas.

Fig. 1 is a sketch diagram of the transmitter in simplified form. The two loop antennas terminals are feeding coils and rods as shown. They are both tuned to 290 kc. and so connected that there is no coupling between them. The coils are coupled to the plate circuits of the two 5000-watt amplifiers. The plate circuits are balanced, which reduces strain between the two tuned loop antennas through the plate circuits of the power amplifiers. A radio-frequency voltage is supplied to the grids of the two amplifiers from a 500-kc. oscillator operating at 290 kc. with direct voltage on the grid applied to the plates.

The plate of the amplifier tubes are supplied with high-voltage (average current through transformer, one being connected to a source of 80-cycle voltage and the other to a 500-kc. 50-cycle voltage). These are the two modulation frequencies, to which the ends of the tuned inductors are tuned. Each power amplifier passes radio-frequency current

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every alternate half cycle, the frequency being 85 to 90 m. c. This means that the plate is positive. The modulated signal from one amplifier is fed to one of the antenna only, and the other amplifier feeds only the other antenna.

The use of a common master oscillator prevents, of course, the inherent danger due to feeding of the receiving set.



Interior view of a beacon monitoring station.

which might occur if two master oscillators were used to feed the antenna slightly in frequency.

As mentioned, the description is illustrative only. In practice means must be provided to prevent the production of harmonics, which are not permissible.

A number of other methods for modulating the carrier to generate at the low frequencies required are possible and have been used. The method just described involves the supplying of plate power directly to the amplifier tubes at the low frequencies desired. This method was not favored, even possible because the necessity of the low frequencies is placed upon the condition of the frequency of the power source available, which is most cases means generator. But with a steady source available, alternators with synchronous motors of special design to drive them would be necessary.

Vacuum tube oscillators controlled by tuning forks can supply sufficient voltage to enable grid or plate modulation of intermediate amplifiers have been developed, and with the difficulty of keeping the low frequency steady. In the present modulation method the modulating frequency is applied upon the grid of one of the amplifier tubes. With the grid modulation method the low-frequency voltage is applied to the grids of modulating tubes, the plates of which are connected to the output of one of the amplifiers as a direct or ungrounded anode to that of the ordinary method of plate modulation employed in broadcasting stations. Such methods give satisfactory performance although the plate modulation scheme has some advantages in that less distortion of the wave form is introduced.

When the beacon is to be used for air routes in some direction, a generator, not shown in Fig. 1, must be introduced. This is a coupling arrangement connected between the antenna and the amplifier, rotating of which is equivalent to rotating the antenna. The generator described for use with this apparatus is shown in Fig. 2. It has two pairs of coils, each pair consisting of an 8 in. radius and a 12 in. diameter. The coils are fed at right angles to each other, and so are the rotors. Rotation of the rotors with respect to the station circuit the same marked on by the beacon in any desired direction. All airports where aerial

beacons intended the beacon course may be set automatically on the selected courses for fixed time intervals.

The beacon can be used with any receiving set which operates at the frequencies used, merely replacing the telephone receiver by the simple modulator unit. There are, however, a number of special conditions involved in receiving on an airplane, and the Bureau has developed special receiving sets in order to use the beacon system under the most unfavorable conditions.

The use of a trailing wire as an antenna has long been recognized as a source of difficulty in airplane reception. Besides its obvious inconvenience and possible danger, it is particularly unsuitable to radio beacon reception because it has a detrimental effect introducing apparent variation of the course and making it more difficult for a pilot to follow the beacon signals. The trailing wire has been eliminated through the development of a receiving set having the necessary sensitivity and other characteristics necessary to receive on a short antenna through the antenna interference. The antenna was used in a total pole extending vertically from the cockpit, having a total length of 16 ft. It has numerous advantages, the best being that it practically eliminates direction errors in the beacon course which have been observed at night.

The receiving set weighs less than 15 lb.; its power supply is a 6 volt battery weighing 35 lb. The receiving set operates



Radio beacon tower at College Park, Md.

in the frequency range from 280 to 300 kc. A current diagram is given in Fig. 3. It is used to receive either the beacon signals or radio telephone or telegraph messages at will. It is highly selective as well as sensitive, and is provided with numerous shielding as well as shielding against extraneous interference. The selectivity of the set depends is supplemented by the great selectivity of the modulators, which help greatly in reducing extraneous noise. It uses 3-volt tubes, selected for freedom from microphone noise. The set

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has remote-control arrangements for tuning and volume, so that the set itself can be out of the way in the tail of the airplane.

The indicator for the beacon signals is mounted on the instrument board in front of the pilot. It functions exactly the same as a telephone receiver except that the vibrating portions are tuned while a telephone receiver responds also equally to all frequencies. The indicator consists of a set of coils through which passes the audio output current of the receiving set, acting on a pair of short steel strips or reeds. These two reeds are tuned to the two modulation frequencies.



Airplane instrument board showing vibrating reed indicator

of the beacon signals. When the two are received with equal intensity the two reeds vibrate with equal amplitude. This vibration is made visible by the motion of white tabs on their ends. These tabs are all that the pilot sees of the instrument, appearing brightening and dimming while there appears a dark background when the indicator is in operation. By plotting the surface on that the two lines are always of equal length, he remains on the indicated course.

While there are no commercial receiving sets at present available which are suitable for use on aircraft at the very frequencies for the air services, close cooperation is being maintained between the Bureau and several commercial companies working on various problems related to radio aids for air navigation. It appears that suitable receiving sets and antennas will soon be offered on the market.

The directive beacons at College Park, Md., and Bellefonte, Pa., operate on 1 kw. Such beacons, located about 200 miles apart, would give satisfactory beacon service when the course usually flown is practically a straight line between them. Where the course varies in direction, lower power beacons at the turning points could be used. Where the course is straight for a considerable distance such as 200 mi., it is planned to utilize a supplementary feature called "marker beacons." The directive beacons constantly guide a pilot along the course but give him no information of the distance traversed along it. This lack is supplied through the introduction of non-directive beacons, placed along the survey at short intervals (perhaps 25 mi.). These marker beacons are of very low power (a few watts), and emit a characteristic signal which the airplane pilot will receive for one or two seconds. They tell the pilot when he is passing over a specified place, so that he can locate himself and always know his position. In fact through keeping track of these marker beacons, the pilot will be able to gauge wind conditions and make any change in direction or velocity so he proceeds during

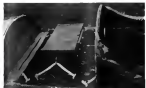
flight. The marker beacons operate a 60-cycle reed vibrator mounted alongside the directive beacon indicator on the airplane's instrument board. Each marker beacon will send the characteristic signal assigned for its location, which will come only when possible with the characteristic flash signal of the light beacon at the same location. Thus the marker beacons actually will come to the pilot in a logical and automatic manner.

The reed indicator can also be used to transmit messages to the pilot when necessary, merely by increasing the transmitting current at a slow rate in accordance with a code understood by the pilot. Additional reeds, tuned to other frequencies, can be used if desired to send special information.

The audio-frequency tuning of the reed vibrator also helps to avoid interference between the beacon beacons. When any beacon station sends modulating frequencies of 50 and 60 cps, the next station could use 75 and 85, etc. Indicators consisting of several pairs of reeds are easily installed on the instrument board of an airplane.

Pilots have been made under practical conditions up to 125 m.p.h. in which the beacons actually determined the course. Four of these flights were made under conditions of low visibility, when the pilot had only the beacon indicator to determine his direction. To a large extent the device is unaffected by interference. It is affected little by airplane engine vibration interference. Such interference does not change the operating characteristics of the instrument, especially in adjusting the distance range from the beacon station. The system was recently demonstrated to various prominent Government officials.

The development secures the full success of the Department of Commerce program of aids to air navigation. It is the intention of the Department to establish radio telephone and



Special receiving set mounted back of the cockpit of a plane.

radio beacon stations along the end airways throughout the country, probably at the principal airports. To utilize such services, airplane operating companies will require only to provide a moderate amount of engine speed and fuel and to install a very simple radio receiving set on each of their airplanes.

Opposed, recently expressed by the leading aviation convention on the necessity of a course indicator that will guide airplanes in conditions of low visibility. The radio beacons provide this, and when the Department of Commerce has completed its development and established the system over the country, airplanes in flight will always have the beacons within available to keep them constantly informed of their location. Indeed, when a pilot leaves his regular course either by accident or to avoid a stormy area, the radio beacons will show him the way back.



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Average speed

Amount of air—10.12 sec.

Amount of air—10.12 sec.

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Yes, All Metal  
but the Tires

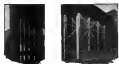
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## SIDE SLIPS

By ROBERT H. OSBORN

With scheduled airplane flights being stopped I was either day now, to all parts of the country, it is not a hard to keep track of them all and to decide who will be seen worthy of comment ten days after a letter for type writer. We must be thankful it was a mighty day, it is the official welcome for a city like New York, it is the same to the confidence that it might not be all but a dozen after all. He must have to get up early every day to run down the news as the police beat to meet all of the incoming. Besides, make the same old speeches and list out the boys in the city, then sit through the same hours of telephone books, their tape and newspapers during to parade up the Avenue.

When you get down to it, New York city is a surprising city a lot in aviation. There's the great airport, it has and has the other side of the city. There are all of those Panhard cars running up and down the Avenue most of the time and the entire town-shoving going on to keep the streets clear of paper. Then all of the traffic in the harbor has to be watched down near the feet of Liberty with the officers, water side, running night in day. Well like to make the comparison that the next in parade is cancelled and the money paid to fix up an airport.

There was quite a bunch in the New York papers the other day when someone suggested that the town of the town is praised in large letters on the roofs of the buildings to the pleasure of waiting fairs. The laughter was because the city is so easy to identify from the air—it is that it is easy to see the city as the country without a decent airport with its measureless distance from the business district.

As some readers may not have seen the announcement of the company a while ago, we think it will be worth the effort to buy a piece of paper for any town which will put its name on a prepared road in still again. The confidence in the company with Wall Street, the same, such a diploma, is a diploma without a portfolio, and another similar certificate.

**"POLISH AVIATORS MAKE 40 HOUR TEST FLIGHT"**  
 Headline.

When they got through with the preliminary, we are in the look-out for real news. This headline is all the news of Roger Williams, after he and Chamberlain had failed by an hour to set an endurance record, that they had an hour flight had been a preliminary test to set if they could get along together for very great lengths of time.

**"FOREIGN RAN YALE FLYING WITHOUT SKIRM PERMIT"** Headline.

Who remembers the good old proprietary school of when we weren't allowed to play football without a job from father?

The recent introduction of aerobically golf at Coney Field on Long Island, has already developed the golf field. It is aerobically golf, you know, two players fly on the course and try to keep the balls as close to it as possible, and their partners on the ground knock it up as the usual way. The pilot member of the first official team said that his difficulty was the neutral stick in the plane was too long, interfering with his balance in the

## AIRPORTS AND AIRWAYS

Houston, Tex.

By J. H. McVey

Visitors to the National Democratic Convention at Houston airport June 24 will have passed at their disposal more than 20 airplanes, according to a recent announcement of Raymond Nelson, director of the airport corporation.

With a somewhat personnel of more than 200 to complete arrangements for the national party, director of the airport corporation is assuming the responsibility of making arrangements for the entire delegation to inspect the new \$200,000 airport constructed about nine miles southeast of the city.

Small planes, especially fitted for photographers to make aerial views, and other jobs, which will be ready to fly at a moment's notice to dispatch special news and pictures for the various agencies that will be working on the national meeting, will be located on the field at all times.

Special arrangements have been made to take care of the lot of ten other planes that will bring the official Wisconsin



A view of the Houston Municipal Airport during its recent dedication.

delegation to the party. Although this is the only group operating definitely that they were coming by air, it is expected that others will wing their way to the convention, and the new airport corporation there will be plenty of roads to take a lot of visiting planes.

There are agencies for the States-Detroit, Waco, Travel Air, and Sealair planes at Houston. Planes are operated by a number of local business men for business as well as private use. A number of these planes are based at the Houston Municipal Airport.

Orlando, Fla.

By E. J. Ray

One reason given to the city is the outstanding features of the Orlando, Fla. Municipal Airport which is expected to open a lot of new ones in July.

The field is probably to be stated as one of the international points on the Atlantic, Key West road route, under the name of the Florida Airways, Inc.

The city was selected and the plan was made by the Airport Committee—L. M. Antevy, Mayor of Orlando; E. C. Nelson, president, Orlando Airlines, Inc.; and Nathan M. Hester, city Engineer.

The city is now taking bids from local contractors for construction of a hangar 80 by 100 ft., large enough to

accommodate three of the largest bi-engineered planes used in the air mail service as well as a number of smaller craft.

Specifications for the hangar which is to be of standard type built for steel and concrete floor, good ventilation, concrete floor, plumbing facilities and electric lighting. There will be sleeping quarters for the keepers. Anticipated cost is \$12,000 to \$15,000. Work commences July 15.

A small auxiliary power plant building is to be erected close to the hangar with foundations sturdy enough to support the 61 ft. beacon tower to be erected when the field is opened. The beacon placed will have a visibility of 18 mi. It will probably be a 30 sec. revolving white light.

There is an eight engine, single power General Electric, 60 hp., revolving white beacon already operating in Orlando atop the 18 story State Bank Bldg. in the center of the city. The Bank intends to continue its operation indefinitely. Even after the municipal hangar is erected, the possible beacon will be very useful as a range light to check compasses, establish drift, etc. Flood lights will be installed and boundary lights will be mounted on the steel fence posts already placed.

The airplane runways which are cleared, leveled, and placed in grass are each 500 ft. wide. The north and south runway is 3000 ft. and the east and west 2000. The only change is being made in the north of the lake to pump more sand into the far end of the east and west runway which is smooth but low.

Salt Lake City, Utah

By E. J. Ray

The Harriet personal plane was now situated at Salt Lake for the Boeing Air Transport machine because the new road, Salt Lake to Cheyenne. An inquiry on the plane was made at Cheyenne, the company is adding to the number about 18 will be on the way, vice president Edward Hubbard announced. Plans for the extra power "pay later" carrying the heavy mail loads over the mountains. The company will announce the company's new line 12 passenger in-Wagon planes will be in service between Salt Lake and Cheyenne about July 1. They are to be equipped, planes with the short order wing. Through a method worked out at the Seattle factory these planes will be practically ready for the passengers.

Two changes in the day-long mountain report on this way are getting the weekly mail—messengers—by plane daily. They keep watch at emergency landing fields among the peaks and look morning are out as watch for the plane to drop the Salt Lake Tribune. Out at 40 mi. east of here is the Wasatch Range, the other from the Salt Lake valley 50 mi. to the north. Foggy, stormy days they don't fly, for then they often aim their papers because the planes do not fly or the pilots get out of range, finding their way over the dangerous area.

Had Downed-Dusk Flyer Warned

Frank Russell E. Mangham, deputy in-look Star, thought he would be across a perfect new P-T training plane recently. About that, Tommy Thompson, executive director of Salt Lake and Earl Vance of the same school of Butte wanted a "re mission" or credit, so they took off with both sides working. Both Thompson and Vance are just about make a plane that is a landing. Mangham, however, has been around his hands and means, while others are



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the field took the view the boys were just showing off. The dauntless Army plane bumped and bounced and rolled, but kept its feet—no sudden landing gear. So far there has been no great risk for double risk landings.

The new 66 by 108 hangar for the National Ports Air ways, Inc., operator of the air mail route beginning July 1 Great Falls to Salt Lake, is almost ready for occupancy. The hangar will house the Fokker Super Hercules for the company with spares. In addition to the hangar the building has numerous offices, waiting rooms, shops, pilot rest and is equipped with modern conveniences.

### Grand Rapids, Mich.

The Grand Rapids Airport, municipal field located two miles south of the heart of the City of Grand Rapids is recently owned property, is maintained by the Grand Rapids Flying Club.

The past few months have seen a considerable amount of improvement under way at the airport, chief among which has been an expenditure of \$5,000 in lengthening and widening a runway, and the construction of a new runway with a taxi. This gives the airport two runways approximately 1,200 ft. long and 100 ft. wide and a taxiway approximately 1,200 ft. long, all of which are 300 ft. wide.

An old house, building, and barn are being removed, and a new of \$5,000 is being spent in the construction of a new taxiway from the entrance gate into the field, the path for automobiles.

Jack Byrne, local distributor for Western Michigan of Stinson Aircraft, is constructing a \$25,000 steel and concrete hangar 100 by 110 ft. in size containing a concrete floor, taxi ramp, shower bath, emergency sleeping quarters, and repair facilities equal to the best.

A pump and tank and jet are being constructed in front of the hangar and Byrne is to take over the distribution of Stinson Aviation Grounds and Stinson and Superior Air Cks.

A number of tree stumps and other hazards on the field are to be removed and the city, at the present time, is completing the installation of beams and flood lights.

Jack Byrne recently received delivery of a six passenger Stinson monoplane and is very much pleased with its use.

A Stinson monoplane belonging to the Thompson Aircraft Co., of Cleveland, O., numbered 104200 on the Detroit State Mail Route for Michigan, was in Grand Rapids recently looking over the field, in preparation to starting its mail service by not later than July 1.

### Detroit, Mich.

By John T. Reed

Following appropriate ceremonies Pilot David E. East, ex, of National Air Transport, recently took off via the first Detroit to Toledo mail run by the Detroit-Toledo route from the transcontinental air mail route. The new service is designed to give Detroit mail, posted here up and 9:30 P. M., immediate delivery in a number of centers and mail delivery service. On these Detroit-Toledo line, the N.A.T. will use a Fokker VII.

G. C. Hyatt, Detroit manufacturer, and member of the New York, recently returned from an extended tour of the East, made in the New York Stinson Express. He and Mrs. E. E. Watson of Flint, nephew and son of G. C. Hyatt, accompanied him on the trip. Jack Price from St. Paul.

Detroit's newest aviation organization, the German American Flying Club, of which Baron Ehrenfried Guenther von Hardebeck, Maj. Jean Pittenger, and Capt. Hans Kuhl, one of the Bremen, are honorary members, recently

held its second meeting at the Fort Shelby Hotel. Harry Lorenz, president of the club, gave the address. The club is the German air service, dating from the World War. It was organized during the Bremen crew's visit in Detroit. Lorenz, Clarence W. Hudson and Hoyt L. Profile, Selfridge Field Club, recently were released from duty by a former Maryland Fokker pilot and his husband, after the officers' return was announced in London. They were Mr. Lorenz, Hudson and Profile were staying in the hotel, when Myra Brown, the actress, and her husband, the proprietor of a hotel near St. Charles, observed them. The members toward the end of the Selfridge Field.

### Wichita, Kan.

By S. R. Korfner

Wichita has just been selected as one of the government airport depots. Word to this effect has been received by V. M. Hamilton from G. H. Maloney at Washington, D. C. Wichita will be one of the 12 airport depots in the United States, each to serve as a distributing point for aerial freight. The depots will be on through air mail and freight routes and will consist with a number of fuel lines. Detonations of Wichita as a distribution point for the New York to Los Angeles plane and from there in will have been instrumental in determining Wichita as the logical city for the air freight depot.

All officers of the Wichita Flying Club, one of the most active aeronautical organizations of the West, were in-cluded at the annual meeting of the club. They are: J. H. Tamm, president; Howard Flesher, vice president; and Bruce Vaughan, secretary-treasurer. The club, which handled most of the national aeronautical events here during the past year, will administer the personnel of the National Air Test last on July 2. Club members will handle the year effort in Wichita.

Three new Stinson biplanes have left Wichita for New York. Eric W. Wood, Harvard graduate, who supervised construction of his plane, was one of the pilots to wing walk. A second Stinson plane went to the New York agency for new crop, after Stinson at Curtis Field. The third was sold to a Canadian dealer and will be delivered at Montreal.

### St. Paul, Minn.

By M. A. Lambrecht

The grounds at the St. Paul Municipal Airport are being leveled and filled in wherever required and since extensive developments are being made, this field will be in first class condition when the proposed improvements are being completed. The words "St. Paul" are embedded in the concrete around upon standing for some distance in front of and to the side of the brick and steel hangar. The concrete wall, now under construction, will connect with this concrete wall adjacent to the hangar so entry to the field by car will be possible during all kinds of weather. J. J. O'Connell, the airport manager, has two assistants, Harold Turner and P. E. Deane.

Tom Lane, who was a passenger with Speed Holman during his winning of the Class A New York to Spokane air derby during the past year, is now flying Airline's Wings for the St. Paul airport. G. A. MacDonell, a group instructor on a Swallow at the students of the Air Service, Inc. of Minneapolis. The Aero Industries, Inc., the Minnesota and North Dakota distributor of the Pietensohn, has a representative at the field to carry on their activities. J. L. Rottschalk, secretary of the Rock Drive Airways, Inc. and Lena Dahlen, the chief pilot, will make a presentation in Minnesota and the Dakota in the Volo present Monocrope, for which they have the distributorship. This small overhead cabin monoplane proved to be of pop-

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operator that they are kept in such an excellent condition.  
Rene Teck, French war ace, has been making frequent  
visits to Curtiss Field since returning from abroad. He is  
getting the Sikorski "Vila de Paris" ready for his next  
trip to California.  
Armstrong, N. Y.

Barrett Airways, operating at Barrett Field, has been very  
active in the last few weeks. A complete photographer de-  
partment has been organized and much work is planned for  
the immediate future. Leo Teretich, chief pilot, recently  
flew in from Wichita, Kan., with a Whitcomb Stearns bi-  
plane. Barrett Airways is now a sub-branch for the Stan-  
wood Aircraft Corp. in Winchester, Kentucky.

Much work has been done on Barrett Field and it is ap-  
pearing ever-improving. The field has been graded and the  
runways are complete. At the end of each runway is a strip of  
crushed stone 10 ft. wide, white-washed to match the runway.  
The approaches to the field are being improved and all the  
trees in the vicinity are being cut down. The field has been  
watered and seeded. The new hangar is now complete and all  
the buildings have been painted. The roof of the field  
office has been marked "Barrett Field" in large letters. At  
White Plains, a few more wires, four indicators have been  
painted on rooftops pointing towards the field. On the roof  
of the University Building is a large sign with the name of the  
town and an arrow indicating the direction of the field.

Four new students joined the flying school recently, bring-  
ing the number close to 20. The ground school course has  
been started with a session every Tuesday evening in the  
field office.

### Spokane, Wash.

At St. Rose Cathedral

Purchase of four new floodlights for the municipal field  
at Parkview has been authorized by the Spokane city coun-  
cil. The cost will be \$1,275. The lights will be ready for use by  
June 30, according to plans. The 1937 national air races were  
held over this field.

Notes that two constant forest patrol airplanes will be used  
in the Spokane area this summer has been received from  
Washington, D. C. Nick B. Messer, manager of the Munter  
Flying Service, said he will submit bids for flying the patrol  
he has had charge of the work for the last three seasons  
when government planes were used.

Messers recently flew a new Bell Aircraft from the Wash-  
ington factory in Tacoma, where he made delivery to the Stern  
Flying Service. He said a similar plane to the Northwest  
Motor Development Co. for use of Sam Wilson, company  
president. Messers flying over Arcadia in his own sports  
plane. He has the Northwest agency for Idaho.

Preparations are being made by Spokane pilots and  
enthusiasts for entertainment of the National Air Tour  
visitors on July 25, the date tentatively set for the arrival here  
of the aerial caravans.

### Augusta, Ga.

By Jack F. Bales

The lights at Daniel Field were recently turned on for the  
first time. M. A. C. Johnson, head electrician, and the honor to  
be the first one to fly by the lights. Soon after he landed Harry  
Bogert, who was stopping at Augusta on his way from Flor-  
ida to New York, took up several of the city officials in his  
Turdell monoplane. The lighting system consists of a 15,  
000-watt incandescent floodlight system on a pole  
or a low-angle quarter of a mile from the field, hangar light  
and a 40-watt beacon which is on the Forest Hill-Richter  
field near the field. All of the equipment is General Elec-  
tric. The beacons burn all night and the other lights are  
turned on when a plane is heard. The city has appointed a

special officer to stay on the field all night to take care of  
all lights.

One of the local oil companies has a special pump mount-  
ed on a truck in order to give quick service to all planes that  
need it.

All planes going from the East to Florida are invited to  
use it at Augusta. The route is about 150 mi. shorter than  
by Atlanta.

### Boston, Mass.

By Daniel Stockton

Robert Airport Corp. has ordered a Ford plane to be used  
only. Gen. Mgr. H. P. Williams said in Detroit and made  
a report and stated that he is presumed September delin-  
quent.

The corporation is expanding the operations and de-  
sires to increase shortly the dissemination of all informa-  
tion on OX engine planes and the adoption of Wright  
flywheels as standard equipment. The proposed standard  
all be completed on the OX planes on hand. The new  
unit rate will be moved up from the present \$300 for 10  
to a probably \$45 per hour.

Douglas Sales of Skyways, Inc., flew a new Stearman  
biplane to Boston recently. The local  
plane flew the plane and passed it lightly. Skyways now  
under Challenge, Stearns plane, and experts even to  
use a half hour Monocoupe.

Robert Airport Corp. has offered an agreement with  
flyways by which they will distribute the Monocoupe with  
a half hour and Skyways will distribute to the north. A  
new arrangement covering Waco and Challenge has also  
been offered. L. H. H. of Hartford hold the basic Monocoupe  
away here.

James Sewall, traffic manager for Colonial Air Transport,  
Inc., at Boston, yesterday, said, and took his private  
Department of Commerce license at the Westfield Air Meet  
recently and is going west to take delivery on an 11-14  
Monocoupe for his personal use at Boston. He expects to  
be at Springfield New England this summer leaving air

### Stanhopeville, O.

During a recent week the new municipal airport was dedi-  
cated by officials of the city of Stanhopeville, the Gates Fly-  
ing Circus being on hand to give away people their first ride.  
The crowd was estimated at 15,000, and 2,455 passengers  
were carried by the Gates plane and the Stanhopeville Flying  
School, owner of the first Stanhopeville field, as it is  
called, is located directly alongside the first Ohio River dam  
near Stanhopeville, and is seven miles from the center of  
the city.

The approachers from north and south are very good,  
two minutes standing for at least a mile either way.  
The field itself is 30 acres, which is very good, all  
is available for landing upon completion of some grading  
with a small 22. This will give Stanhopeville a real airport  
and all visitors will be taken care of satisfactorily, good  
and it serves being on the field and hangar space for three  
miles. The Stanhopeville Flying School, headed by J. B. Moore  
and L. H. Chase, have the distributors for Waco  
flies in Eastern Ohio and operate a school of instruction.  
They are flying a Waco 30 and a Cessna. One student  
has purchased a new plane.

### Cincinnati, O.

By Daniel Newman Leeb

John W. Cowell, attorney, is the new president of the  
Cincinnati Aero Club, succeeding A. H. Cowell. He was  
seen at an at a recent meeting with Frank M. Cowell,  
president, and James Watson, James Watson, Edward Ste-  
wart, Charles Schaeffer, Edward Thompson, and John E.  
Rice, officers. The new president was presented with a

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gave by the retiring secretary, Julius K. Fink. Donations efforts will be made to increase the club membership from 27 to at least 200. Formal opening of the club's flying field on the Union Levee (near the municipal airport) was to occur June 17, as *Aviation* goes to press. All are urged to aid in this work on the program.

### Wilmington, Del.

Henry R. de Paul, treasurer of the E. I. de Paul de Paul, Inc., has purchased one of the new Pietenzo four Mustangs equipped with a Wright Whirlwind engine. He has five other planes from Pietenzo Field, in Wilmington, France, just north of Philadelphia, in one lot.

The new craft is a modification of the Pietenzo Mustang now being used in the New York-Philadelphia-Albany air mail service. It is one of the best commercial craft on the market, having a high speed of approximately 150 m.p.h.

Mr. de Paul's plane has been built to carry more than 100 lb. of gasoline. It is so constructed that only a small amount of fuel is left for baggage, the gasoline tank taking up most of the room in the plane.

Charles T. Leonard, president of the Delaware Philadelphia Flying Service, was an interested visitor last month. He inspected the Port Field, Henry de Paul's private airport, and visited the site of the new Baltimore flying base.

**Manitowoc, Wis.**

The common cold of Manitowoc has withered the purchase of a 100 acre tract of land for a municipal airport, which was the main time took an option of an additional 50 acres for 15 months to permit extension of the field, it is said. The terms of the purchase of the 100 acre tract at \$200 per acre with a cash payment of \$1,000 at once a sale and the balance to be paid within 10 years at four and a half per cent interest.

The expense of the airport project across the establishment of an airplane factory in Manitowoc, planned by the Inconceivable Metal Furniture Co. Another result of the movement will be the establishment of a school of aviation to be directed by W. G. Williams, who will develop an air transport of the airport and conduct the school at the field.

**Kilbourne, Wis.**

Wisconsin's Delta has a landing field now, comprising 5 acres and designated on government maps as Bureau No. 2. The port is on the Milwaukee-Minneapolis route and is operated by Clinton Berry. Berry built the field because of numerous inquiries regarding airplane landing facilities in that vicinity. The Delta has been for their benefit and will visit the spot each summer.

**San Diego, Calif.**

H. D. Rickard, San Antonio resident and property owner in 17 streets and four Canadian partners, took delivery of Ryan Mustang No. 77 April 16 and made that first test flight 20,000 ft., visiting 50 states and Canada. Rickard's plane has been undisturbed and reported that the air handlers recently delivered in Colonel Lindbergh. On the 26th of April flew from San Antonio, Tex., to San Diego, a distance of 1,200 mi. in 11 hr. and 30 min. making two stops.

A tour of California followed, after which the plane returned to San Diego for installation of longer legs, thus enabling the completion of longer flights with less stops.

**Medford, Ore.**

The chamber of commerce has selected a site for a proposed airport in close proximity to the city and will be placed immediately for the construction of the field. A lot area will be submitted to the people to finance the project. Aviation authorities have favored the site.

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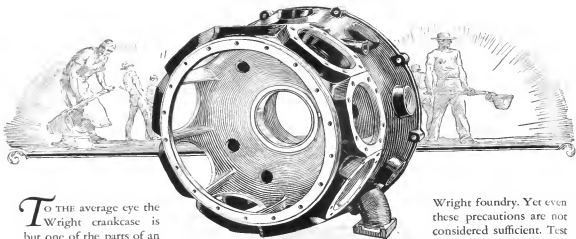
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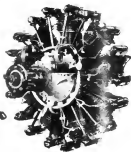
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